Radio control Models and electronics

JULY 1966

MAP HOBBY MAGAZINE

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RADIO CONTROL SUPPLIES

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Skyleader Proportional	£132

★ R/C EQUIPMENT ★

R.C.S. "Guidance" Mk II	13 gns.
R.C.S. "Guidance" Mk III	14 gns.
Compact Acc outfit	£4½
Motor Control Acc outfit	£3
R.C.S. Inter 6 Tx & Rx Reg.	£34
Superhet 6 version	£46
R.C.S. Single superhet outfit	£23
,, ,, with relay	£24
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R.C.S. 2-6 Super-regen Rx	£12½
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MacGregor Minimac Rx	£9
O.S. 6 Channel Superhet	£57
E.D. Autopilot	£9½

★ R/C ACCESSORIES ★

RMK Multi Servos (Trans.)	178/6
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RMK Dynamite	89/6
Elmic "Commander"	59/6
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Elmic "Conquest"	35/-
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McCoy 19 R/C 3.2 c.c.	99/6
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Fuji 15 W/C R/C	157/-
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Fuji 35 W/C R/C	240/-
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DEAC 7.2V 500 DKZ	80/-

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RADIO CONTROL SUPPLIES

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Radio control Models and electronics

July 1966 **VOLUME 7 NUMBER 7**

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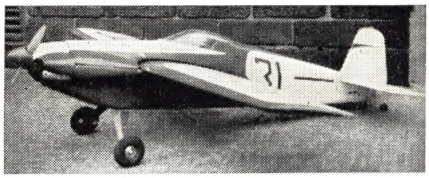
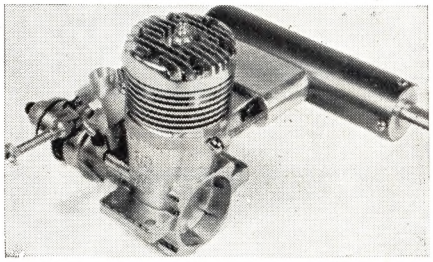
HIGHLIGHTS OF THIS ISSUE

Dave Platt's T-28B *Page 330*



Skeeter Goodyear Racer Plans *Page 337*



Peter Chinn on R/C Engines *Page 344*

On the Cover

One of the R.C.M.&E.'s own models forms this month's cover subject. Our Denight Special Goodyear pylon racer, built from the Sterling kit, was one of the best fliers we have ever had — we say **had** because it ended in a very nasty crash which you can read all about on page 342. The finish is an example of what can be achieved with Top Flite MonoKote covering material, which allows the "average man" to obtain that super finish which he always dreamed of.

Coming next month

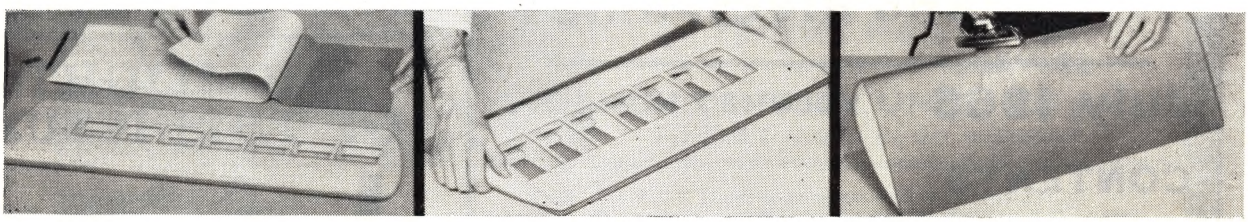
A full report on R/C activities at the British National Championships for model aeroplanes — don't miss it. Also plans for a six channel sport aircraft, plus boat plans and kit reviews.

Revolutionary New!

TOP FLITE MONOKOTE

FROM .... RipMax

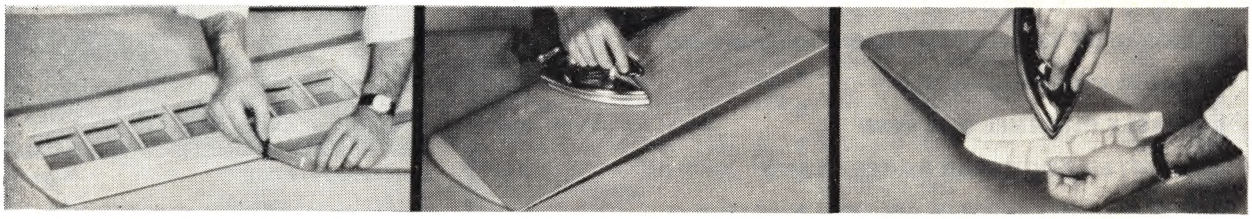
The covering with the built-in finish



1 Cut the panel slightly oversize, then simply peel off backing paper.

2 Lay part to be covered over sticky side of MonoKote and smooth down in place around edges.

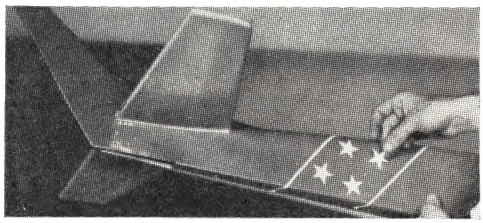
3 Edges should now be PERMANENTLY SEALED by smoothing with an ordinary electric iron.



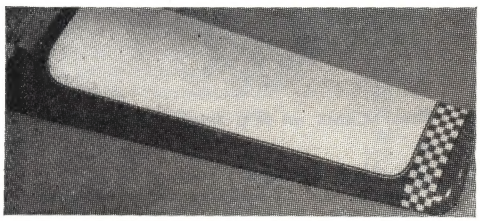
4 Surplus covering is then simply trimmed off. Save the pieces for trim, etc.

5 To remove wrinkles and draw MonoKote PERMANENTLY TAUT just glide iron over the surface.

6 Tips, compound curves, etc., are best covered with separate pieces warmed and stretched in place.



Fuselages with compound curves are best covered in sections. Technique is the same—and foolproof.



Trim strips and decorations are easy to apply. Simply cut out the shape, lay in position and bond permanently with electric iron heat. No mess, no fuss — and FAST!

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FALCON 56 . . . 131/6 56″ span for single to 6 channel, .09—.19

SNR FALCON 252/- 69″ span for 10 channel multi engines .35—.45.

54″ span-Engines .19 to .40

A SUPERB KIT 197/6 Here's the most beautiful R/C model ever kitted — a Goodyear Racer with enough stability for ANYONE to handle! For 6, 8, 10 channel or proportional. You can use 'Shoestring' for Sport or Contest flying and pylon racing.

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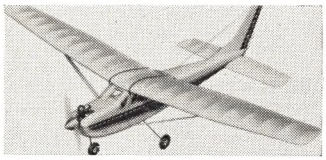
Jr SKYLARK . . .54/6 37″ span. 049 or twin 02's.

SKYLARK 56 . . . 153/6 56″ span for single to 10 channel Engines .09 to .19 (single or twin)



SKYLANE 42″ span . . . **65/-** 63″ span . . . **219/6** Two beautiful models—the '42' for single channel and the '63' for multi or proportional. Both fully prefabbed kits.

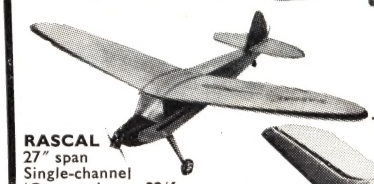
TOP FLITE F R/C

ROARIN' 20 **32/6** for .01-.02 eng.

TAURUS £14.19.6 The 'world champ' R/C multi model—70″ sp. 45's up.

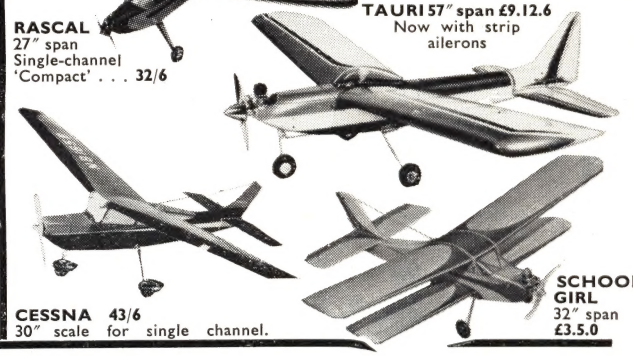
SCHOOL-MASTER 39″ span .049-.09 **21/6**

also 29″ sp. **SCHOOLBOY 38/6**



RASCAL 27″ span Single-channel 'Compact' . . . **32/6**

TAURI 57″ span £9.12.6 Now with strip ailerons



CESSNA 43/6 30″ scale for single channel.

SCHOOL-GIRL 32″ span **£3.5.0**

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Sterling models have achieved International recognition as the pacemakers in setting consistently higher standards for authenticity, beauty, performance and quality

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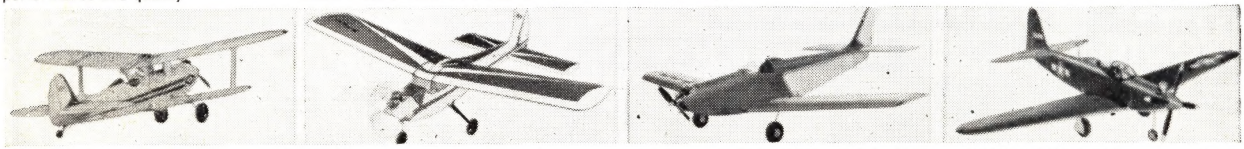

WIZARD 54″ span . . . **£7.2.6** Semi-scale biplane for single or multi radio and engines .09 up to .45. A superb kit for beginners or expert.

MAMBO SPECIAL . . . £7.2.6 The fabulous 'Mambo' sport or trainer design in 52″ span size for .09 to .19 engines. 1 to 6 channels.

L'11 ROUGHNECK £2.3.6 22½″ span. Specially designed to bring out the best in single-channel performance

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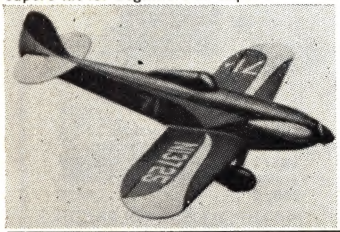

This Month's

COVER MODEL!

The DENIGHT SPECIAL

Here's the latest in a long line of 'Sterling' successes! Takes engines from .19 to .40 (the latter size for Pylon Racing) and handles like a dream. Fly on 'multi' from 6 ch. up; or 3+1 or full proportional. A real beauty for looks, too. De luxe kit, fully prefabbed **£10.19.6**

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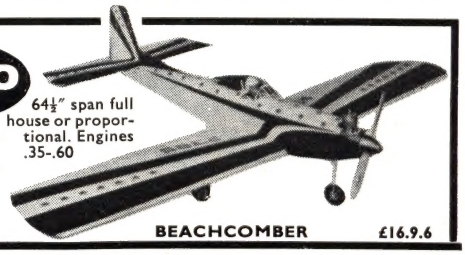

64½″ span full house or proportional. Engines .35-.60

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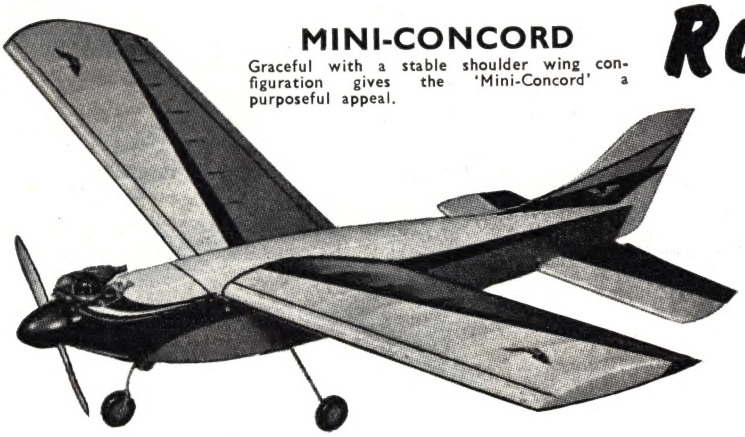
VERON

RADIO CONTROL Round-up !

MINI-CONCORD

Graceful with a stable shoulder wing configuration gives the 'Mini-Concord' a purposeful appeal.



For use with Single Channel Radio Control for Rudder and 'flip-up' elevator with rubber driven actuators). A high degree of pre-fabrication—spindled cowls, etc. Designed for motors of 1 to 1.49 cc. (.061 to .099 cu. ins.
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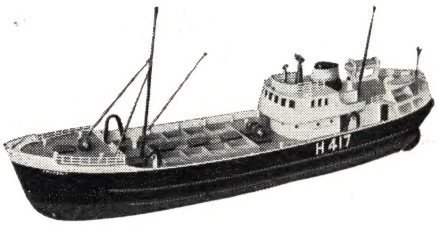

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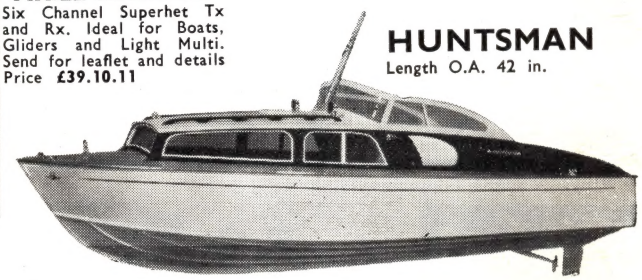

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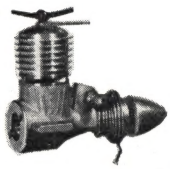
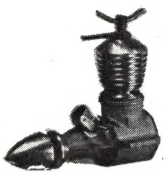
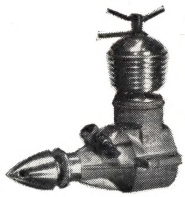


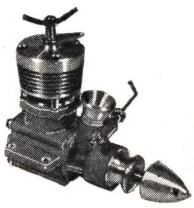
PICCOLO
.8 cc. **75/4**
Marine Version **115/2**



RECORD
1.5 cc. **81/10**
R/C Version **92/6**
Marine Version **124/1**
R/C Marine Version **135/10**

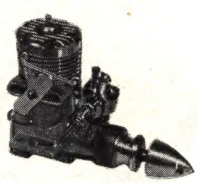


WINNER
2.46 cc. **95/4**
R/C Version **106/2**
Marine Version **137/5**
R/C Marine Version **148/10**



MACH II
2.47 cc. **161/8**
R/CVersion **175/11**
Marine Version **216/4**
R/C Marine Version **231/11**

BULLY II
3.44 cc. **133/10**
R/C Version **148/8**
Marine Version **183/1**
R/C Marine Version **200/7**



GLO-STAR
3.5 cc. **132/9**
R/C Version **147/6**
Marine Version **170/8**
R/C Marine Version **186/8**

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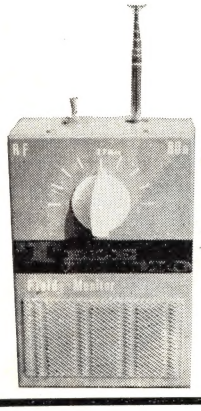
Miniature Edgewise Meter

200 μa **22/6**



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DIGITRIO 3 channel proportional kit as described in USA Mag. RCM. The most advanced design yet offered for home construction. Not cheap but very good. Limited number of constructional booklets soon available at **30/-** each. Price of units. TX **£16.10.0.** RX **£9.5.0.** Decoder **£11.0.0.** Servo Ampl. **£9.15.0.** Printed circuits TX **20/-.** RX or Decoder **8/8** (drilled **13/6**) Servo Amp. **20/-.** Transfiller FLI **10/-.** For transistors see below. Cases. Anodised **30/-.** Drilled **55/-.**

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Easy Tran S/C beginners TX **£5.7.6.**

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Audio Oscillator 200/1000 cps. Kit of parts 79/- plus case.

Send 6d. S.A.E. for further particulars of any of above.

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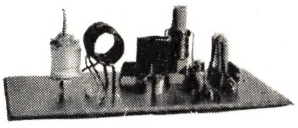

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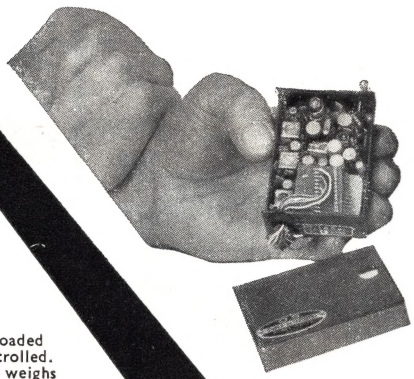

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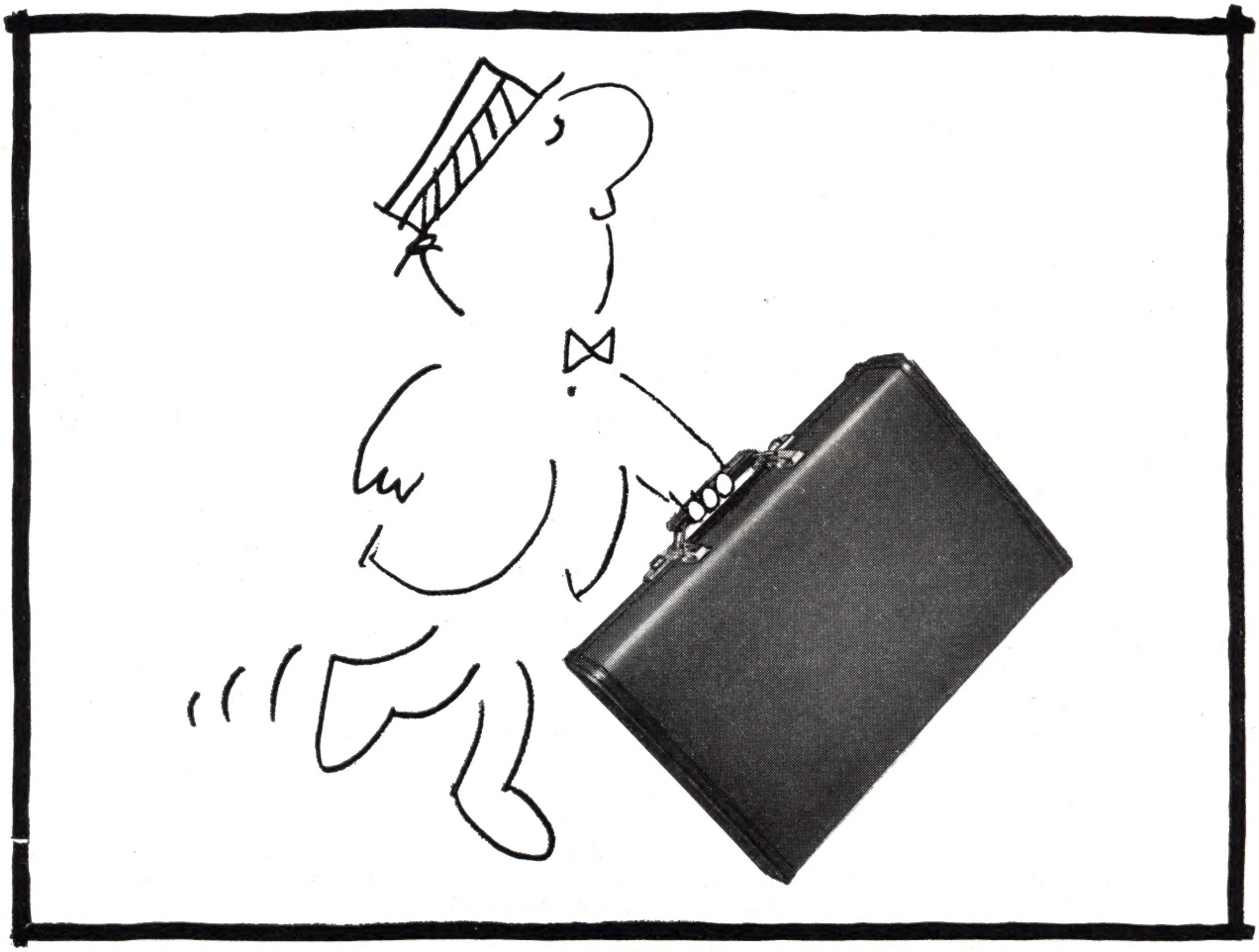

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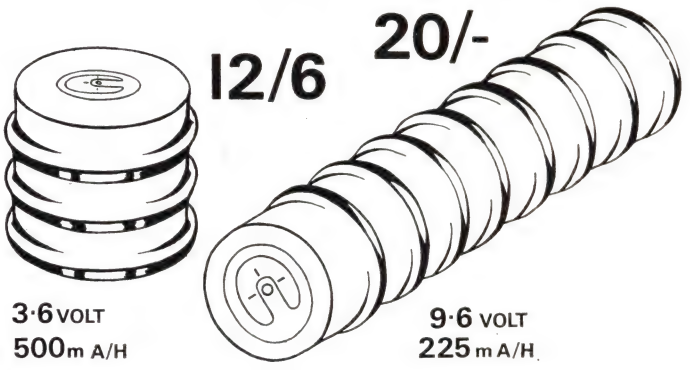

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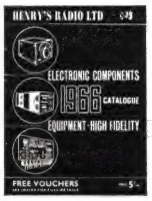

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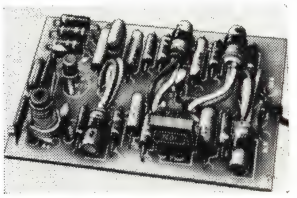

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Min 9v. 165 ohm 2p2 way	12/6

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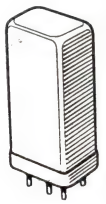

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*LT700 ,, Output to 3 ohms 4/6

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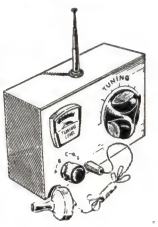

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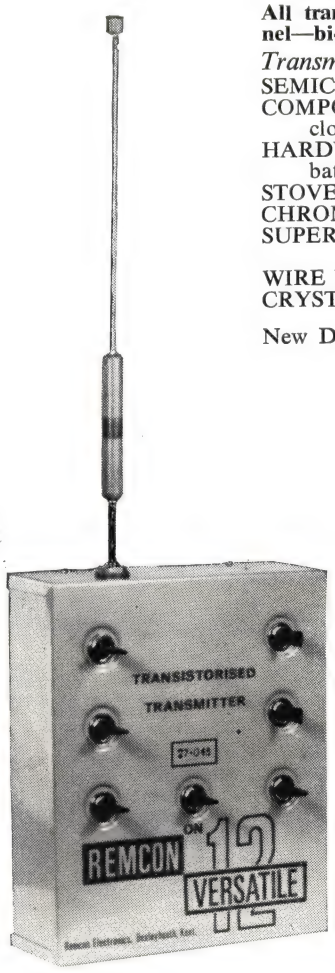

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COMPONENTS—resistors, transcaps, and electrolytic condensers. Decorated case with grommets	63/0
SEMICONDUCTORS—micro-alloy transistors and diode ...	45/0
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COMBINED CONSTRUCTION MANUAL for Tx and Rx ...	6/0
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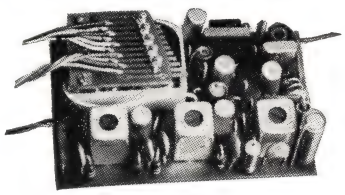

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THE VERY LATEST IN TECHNICAL BOOKS FROM MAP

Multi channel control is probably what most radio control enthusiasts seek, eventually, to achieve. But all too often, introduction to this more advanced stage of the radio control hobby is fraught with problems brought about by sheer lack of knowledge of the subject. It is for this reason, to help the beginner over his problems, that MULTI CHANNEL RADIO CONTROL has been introduced.

Here the beginner will find explained in simple terms the working of multi channel equipment which so often is a mental barrier and can itself lead to dismal failure.

Today, people are regularly entering the radio control hobby without previous modelling experience. Some years ago, these newcomers would have begun their radio control career with single channel equipment, but today it is not at all uncommon for a newcomer to begin radio control activities with multi channel equipment. For these people especially, there are no short cuts to multi channel success, and for these, or any beginner, MULTI CHANNEL RADIO CONTROL is an indispensable reference work.

This publication has a bright, full colour photo dust cover, cloth covered boards and gold blocked title on spine. There are 112 pages size $8\frac{1}{2} \times 5\frac{1}{2}$ ins., printed on high quality gloss paper with numerous line and photo illustrations.

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SWITCH ON

THIS issue marks the introduction of a new column devoted entirely to single channel radio control. This new feature which is appropriately entitled "Single Channel Chatter" will be appearing regularly as an aid and an interest for all single channel radio control enthusiasts who, despite the continually increasing interest in multi R/C, still remain the largest single group within the radio control hobby.

"Single Channel Chatter" will therefore be aimed at improving the standard of single channel radio control with the emphasis on general sport flying, showing ways of obtaining the maximum enjoyment from simple equipment.

Our May edition "Pilots' Patter" suggestion that the standard of single channel radio control flying is very low, has brought forth a strong refutal from an ardent group of single channel fliers, which you will find on page 348. Nevertheless, most single channel enthusiasts, will, we are sure, agree that the single channel state of the art is not all it could be. Here then is where *your* column comes in—so if any of you one-button aces out there have an opinion to air, some advice to give, or an idea to pass on that will be of aid to others, then why not say it in "Single Channel Chatter"—Gentlemen, the floor is yours.

Whilst on the subject of single channel radio control, it is very pleasant to be able to record an upswing in the number of commercial single channel systems becoming available.

Recent introductions include the Raven tuned filter single channel control systems which permit three-at-a-time operation. A.B.C. Electronics' Mini-Sonic system is beginning to appear and Radio Control Specialists have announced new and better versions of their single channel equipment including a new, smaller superhet receiver. Elmic—long associated with the single channel field are currently announcing a small, lightweight superhet receiver (what many single channellers have been wanting for a long time we suspect) and MacGregor Industries

HOLIDAY WITH R.C.W.C. No! This is not a new form of sanitation! As modellers will have realised the abbreviation is for the Radio Control World Championships scheduled to be held at Ajaccio, Corsica, 21st—26th June 1967. Maybe this is a little far ahead; but one has to plan well in advance, particularly when the venue is on an Island in the Mediterranean.

There is a strong possibility that a special 15 days tour holiday offering 14 nights accommodation in Corsica can be arranged with air travel by regular scheduled Air-line flight to Nice and boat travel to Corsica for approximately £70 per person all inclusive.

Readers who are interested in joining an organised party taking advantage of this reduced rate are invited to let us know at the earliest opportunity. (For cost comparison tourist excursion London to Corsica is approx: £44 plus hotel costs, etc.).

are also planning new additions to their line of single channel equipment. Add to this, the imported units like Futaba, and O.S., and it becomes readily apparent that for single channel enthusiasts, things are looking up. Let's make the most of it.

Swedish Boomerang

In the midst of the toughest winter for many years a Swedish radio control modeller in the Skvadern club was flying his "Radio Cub" on the ice covering a small lake and surrounded by tree covered hills. It was absolutely calm and quite suddenly the transmitter drew no response from the model while it was overhead. The result was a full speed straight flight over the hills and far away in the direction of the North Pole.

Our enthusiast was not one to take such things lightly, grabbed his equipment and set off, presumably on snow shoes, ready for a desperate search.

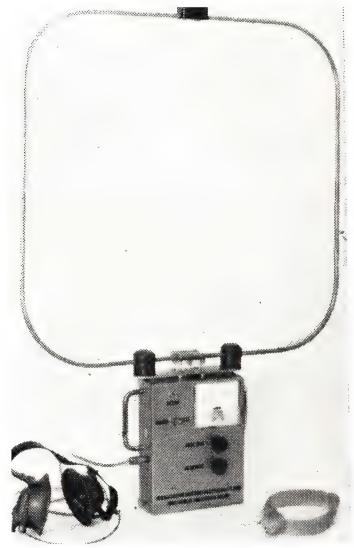
When just ready to start his chase, he heard the drone of a model engine, looked up, and behind him from the south was his own model on a return flight! It had made a very wide circular flight pattern and in the calm conditions, had not drifted.

Desperately, he unpacked his gear, grabbed the transmitter and to his joy found that it worked to bring the model down to a perfect spot landing—who could be luckier than that?

Super Direction Finder

The interesting device illustrated right was developed by Radio Control Specialists as a direction finder, supplied to the Government for use in tracking pests in order to study their living habits. The transmitter shown in the foreground, which goes round the neck of the subject animal, can be located from over a mile distance when placed in a rabbit's burrow 3 feet below the ground. It transmits continually for a period of 3 months.

Very handy for finding models?



R.C.S. D.F. unit with loop aerial. Tx. unit bottom right fits around neck of animal.

S.M.A.E. R/C Competition Aug. 14th

No multi channel radio control enthusiast who enjoys either competing in, or just watching multi aerobatic contests should miss the S.M.A.E. organised multi competition on August 14th, which will be run at the Recreation Ground, Leigh Flats, Leigh-on-Sea, Essex.

To cope with the anticipated large entry, there will be two independent flight lines, and competitors will fly one round for each set of judges. Catering facilities are to be laid on, and there will also be a trade display.

Contest Fixtures

Aircraft Rallies

June 12	West Mendip Slope Soaring Meeting, Crooks Peak Nr. Weston-Super-Mare. Single & Multi R/C. Details from P. Heeley, Catcopp, Station Rd. St. Georges, Weston-Super-Mare.
June 19	Bath Festival 1966 Radio Contro! Contest, R.A.F. Colerne. Scale and Concours (S.M.A.E. Rules); F.A.I. Multi Aerobatics; Goodyear Pylon Racing (N.M.P.R.A. Rules); Details S.A.E., to Dr. G. Henley, 47 Pembroke Rd., Clifton, Bristol. 8.
June 26	Northern Area Slope Soaring Meeting, Black Mambleton Hill, between Hawnby, Thirsk and Northallerton—Single channel Spot landing.
July 3	Esher Intermediate R/C Gala, Shuttleworth Collection Airfield, Old Warden, Beds.
July 10	Clwyd Slope Soaring Meeting; Multi and Single.
July 17	S.M.A.E. Scale Meeting—R.A.F. Swinderby Ripmax Trophy (Single Channel Scale).
July 24	South Coast Gala—R.A.F. Tangmere, Nr. Chichester, Sussex.
Aug. 14	S.M.A.E. Multi—Leigh Flats, Leigh-on-Sea, Essex.
Aug. 28	Kirkcaldy R/C Rally. Donibristle, Fife. Single and Multi Pre-entry to A. Morrison, 185, St. Clair Street, Kirkcaldy, Fife, Scotland.
Sept. 4	S.M.A.E. Northern Gala—Venue to be announced Multi-Taplin Trophy.
Sept. 4	Boscombe Sport Rally, Everleigh Dropping Zone, North Tidworth, Wilts. Single channel, time monitored spot landing.
Sept. 4	Possible S.M.A.E. R/C Team Trials—venue to be announced. Multi R/C.
Sept. 18	South Midland Gala, Cranfield, Beds. Free style multi; single channel spot landing.
Sept. 24-25	R.A.F. M.A.A. Championships, R.A.F. Debden.
Sept. 25	Luton D.M.A.S. Slope Soaring Rally, Ivinghoe Beacon, Beds. Multi and single spot landing. D. Bateman, 14 Ridgeway Drive, Dunstable, Beds.
Oct. 2	S.M.A.E. Southern Gala—R.A.F. Odiham, Oxon. Aeromodeller Trophy (Multi R/C).
Oct. 16	South Coast R/C Rally, Golden Cross, Nr. Lewes, Sussex. Single and Multi events.

M.P.B.A. Provisional Regatta list

June 12	S. London E.P.B.C. RC Speed & RC Steering. 11.00 a.m. 1/-.
19	Brighton & Hove S.M.E.
19	Walsall M.B.C. Walsall Wood.
19	Fleetwood MY & P.B.C.
19	Portsmouth M.P.B.C. Hilsea Lido. RC Steering, RC Speed.
26	Walthamstow M.C. Whipps Cross, Leytonstone, 11.00 a.m. No Fee.
26	Hounslow M.P.B.C., Century Club, Felix Lane, Shepperton.
July 3	Victoria M.S.C. Victoria Pk. 11.00 a.m. No Fee.
3	Cygnets Maidstone. RC Pairs Steering. Golden Guinea Trophy.

GADGETS AND GIMMICKRY

BRIGHT IDEAS FROM OUR READERS

Flaps with low speed throttle — Sketch A

(*J. M. Bridle, Christchurch, Hants.*)

Although multi channel aircraft rarely use flaps, this is an auxiliary control that could be given more attention. J. M. Bridle suggests a fairly simple linkage to obtain depression of wing flaps from the throttle servo when low speed is commanded. The servo used by our experimenter was a *C & L Musclemite* but naturally, others could be used. A paxolin disc is added to the drive arm, attached either with Araldite or with self tap screws. A 16 s.w.g. piano wire pushrod is then attached to the disc, to engage with the two parallel cross wires which join the flap halves. A small washer is soldered to the pushrod so that, as the throttle servo is retarded, the flaps are lowered. The flaps are spring biased to the "up" position by rubber bands or spring as desired, and the linkage illustrated has the advantage that the wing remains easily removable from the fuselage, even though the mechanical linkage employed, eliminates the use of an extra servo.

Obviously, the linkage illustrated, need not necessarily be rigidly followed and the flap pushrod need not be coupled to a disc on the servo. One alternative linkage would be to attach a bellcrank to the bulkhead, connecting the flap pushrod to the horizontal arm and a connecting link from the throttle servo to the vertical arm.

Repairing Wheels — Sketch B

(*M.C. McCrae, Brussels, Belgium*)

Good pneumatic, air-trap type wheels such as the American *Airspan* or *Du-Bro* types are definitely expensive items, and if damaged in any way, require another heavy drain on the pocket for replacement. M. C. McCrae suggests methods of repairing two types of damage.

Firstly, if two wheel hubs become damaged, the damaged halves can be sawn off and the two remaining good pieces re-joined with Araldite.

Tyres are a different problem and can be cut to pieces if subjected to heavy treatment. However, if the tyres do become punctured, they are not necessarily finished and will continue to give good service if stuffed with foam plastic.

Simple Silde Switch — Sketch C

(*K. Hamer, Barnoldswick, Lancs.*)

How many ways are there to make a simple on/off switch? *Gadgets & Gimmickry* always seems to be running into new ones—this latest device contributed by K. Hamer. This is a very clever little single pole slide action unit and requires only a few pieces of scrap material. A piece of copper laminate is cut to the dimensions provided and the copper cut with a scriber as shown. A piece of .010 shim brass is shaped around the copper laminate to form a slider. The slider is then topped with a paxolin button Araldited to the brass.

To "make" the circuit, the brass slider is slipped along the laminate until it bridges the gap in the copper.

Aileron Linkage — Sketch D

(*J. M. Harrison, North Ferriby, Yorks.*)

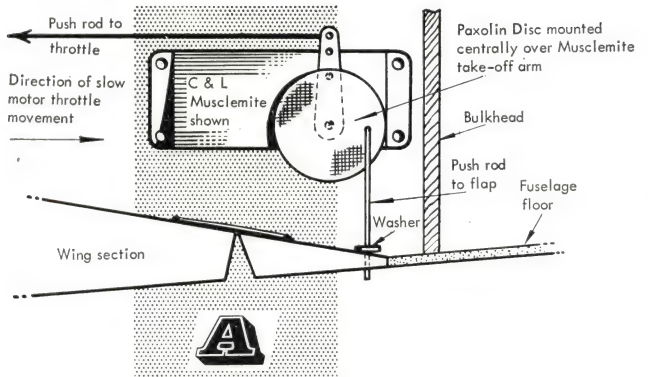
Sketch D shows an aileron linkage for single channel escapements used by J. M. Harrison, in conjunction with an *Elmic Conquest* escapement, with a 22 s.w.g. dural lever added to the output shaft. This is held in place by rubber sleeving, which allows a little flexibility as required. The remainder of the linkage is made up of 18 s.w.g. piano wire, while the torque rods to the ailerons are made from 20 s.w.g. wire. The assembly is held in position by short pieces of heat-proof electrical sleeving. Mr. Harrison stresses the importance of holding the wing firmly in position to avoid accidentally binding the linkage.

Neat Wiring Harnesses — Sketch E

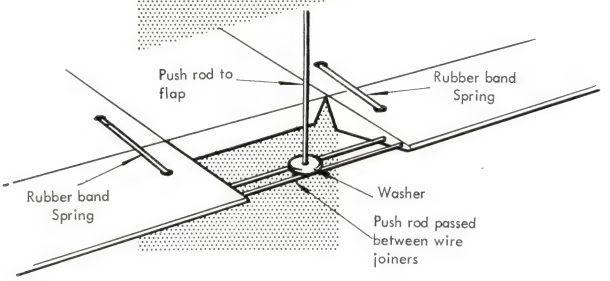
(*J. Horrocks, Burnley*)

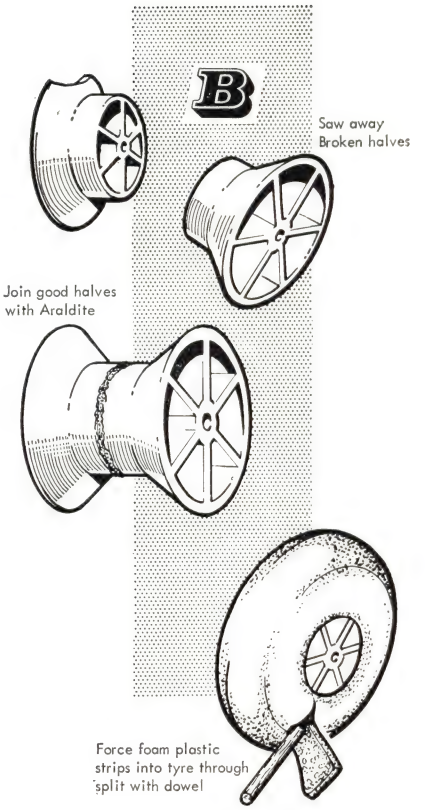
To avoid the "rat's nest" type installation, J. Horrocks suggests the tidying up procedure shown in Sketch E. The run of the wiring harness inside the model is first planned and then Polyglaze strip stuck over what will be the cable run. Polyglaze is tacky both sides, so that the harness can be run in even lines along it. When the harness is complete, apply a couple of coats of balsa cement for a really rigid finish. "Polyglaze Duplex Bonding Strip", to give its full name, is sold in 40 ft. lengths ($\frac{3}{4}$in. wide) and costs 5/-d.

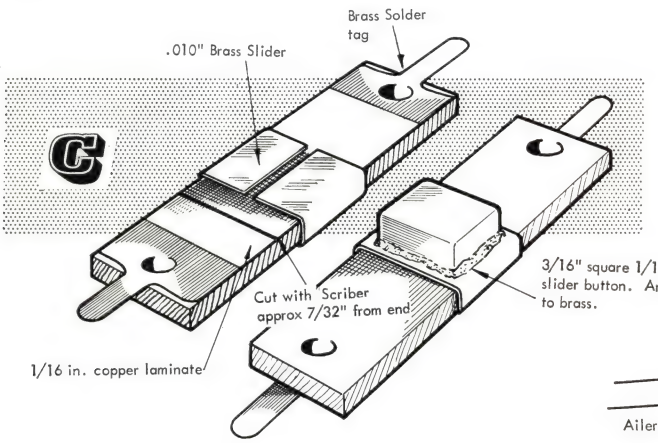
Another variation on the same theme assists the winding of R.F.C. coils. The coil former is wrapped in Polyglaze tape and the coil wound over it—adhesive holding the coil in place. The usual coil sealing medium may also be applied.

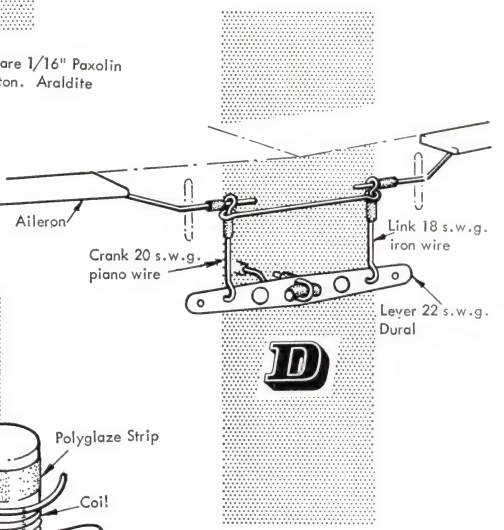

Push rod to throttle
Direction of slow motor throttle movement
C & L Musclemite shown
Paxolin Disc mounted centrally over Musclemite take-off arm
Bulkhead
Push rod to flap
Fuselage floor
Washer
Wing section

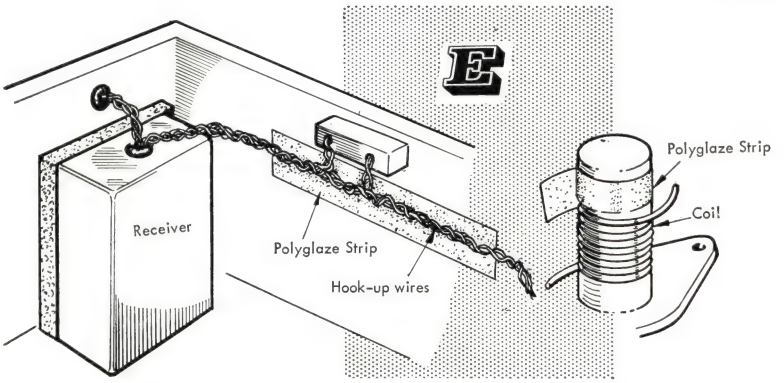
A

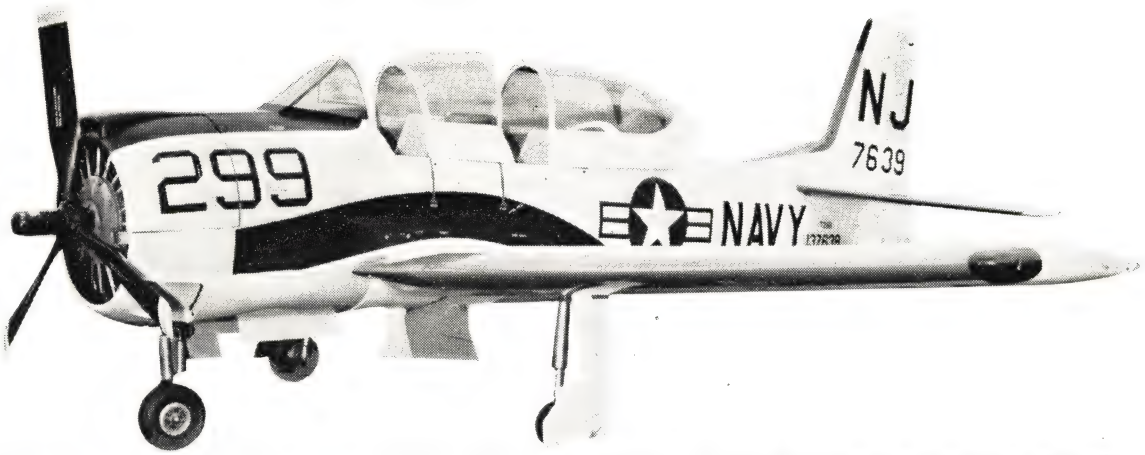

Push rod to flap
Rubber band Spring
Rubber band Spring
Washer
Push rod passed between wire joiners


B
Saw away Broken halves
Join good halves with Araldite
Force foam plastic strips into tyre through split with dowel


Brass Solder tag
.010" Brass Slider
C
3/16" square 1/16" Paxolin slider button. Araldite to brass.
Cut with Scriber approx 7/32" from end
1/16 in. copper laminate


Aileron
Link 18 s.w.g. iron wire
Crank 20 s.w.g. piano wire
Lever 22 s.w.g. Dural
D


E
Receiver
Polyglaze Strip
Hook-up wires
Polyglaze Strip
Coil



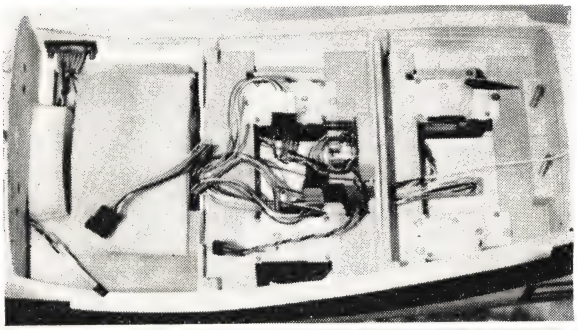
MODEL OF THE MONTH

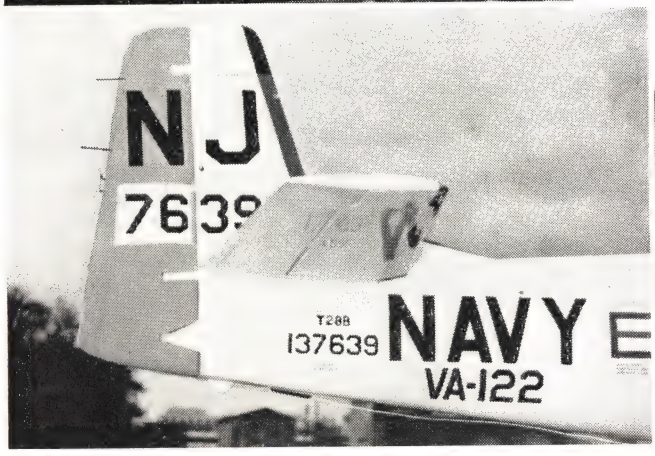
SUPERB NORTH AMERICAN T-28B MODELLED BY DAVID PLATT

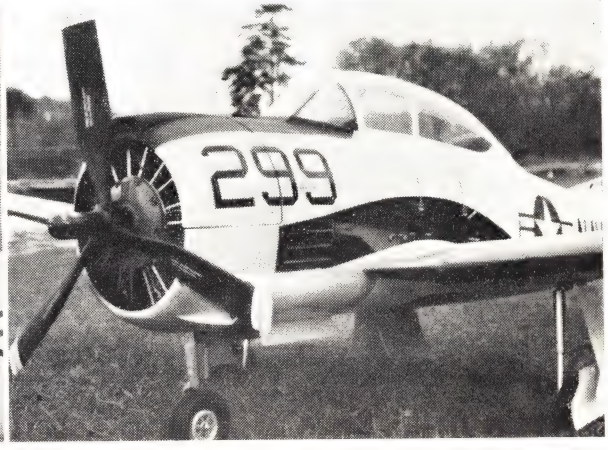
ARMED with a thick wad of drawings, and photographs, to prove scale authenticity, Dave Platt arrived at R.C.M. & E.'s office recently, complete with the result of 6 months building, in the shape of a magnificent scale model of the North American T-28B trainer aircraft. In fact, so determined was Dave to achieve complete accuracy, that he also had a wad of photographs, data, and a pile of correspondence from the P.R.O. of U.S. Naval Air Squadron VA-122 stationed at Naval Air Station, Lemoore, California, U.S.A., where the full size example modelled by Dave is on charge. The P.R.O. had patiently answered all questions regarding colour scheme and detail.

This T-28B spans 66⅔in., and weighs 10 lbs. 14 ozs.—just 2 ozs. under the competition limit. Radio installed is *F & M 12* with four *RMK* multi servos and one *Soraco servo* (Bonner) for aileron control. The scale propeller shown in the photographs here has a diameter of 17 ins., but for flying, a 13 x 6 in. Trucut prop. is fitted to the *McCoy 60* motor, which is modified to employ a *Merco* throttle, the barrel drilled out as much as possible.

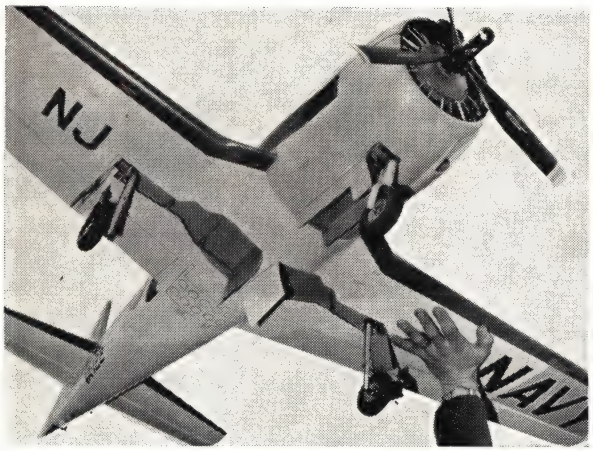
The basic finish is a complete covering of white *Monokote*, over which two pack *Polyurethane* was brushed. Day-glow areas are sprayed *Humbrol "Blaze"*, and rivet lines applied with a clockwheel. Black numbering is also Polyurethane and scale stencilling is reproduced with *Letraset*.

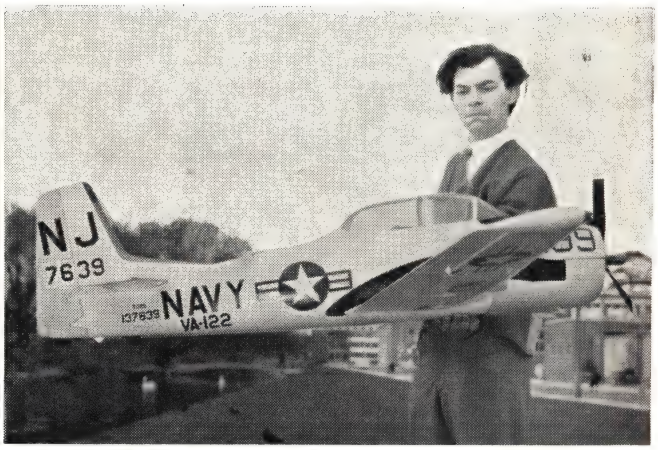






Left: Cavernous radio compartment showing installation of F & M receiver and RMK multi servos. Note bolts for wing retention. Bottom left: tail cone of model, showing scale control surface hinges. Note static dischargers on rudder trailing edge. Below: Close-up of nose section. McCoy 60 powerplant is hidden behind dummy scale cylinder ring.





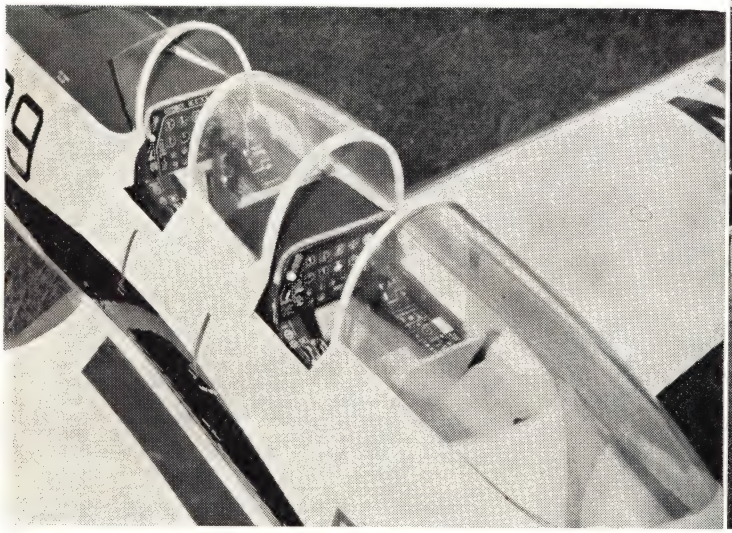
Above: underside of T-28B showing realistic tricycle undercarriage. Note undercarriage wells. Above right: undercarriage is fully retracting—this is how the model looks with gear "sucked up".

The undercarriage is fully retracting—including the two-piece undercarriage doors. The retracting units are basically *DeBolt Retract Gears*, reworked extensively and geared down to be seven times slower than the regular DeBolt gear for scale effect and power enough to lift the long, heavy legs. The three independent mechanisms are wired to start in sequence to minimise the start load on the 6v. 500 DKZ receiver/servo DEAC power supply. Each unit weighs 6 ozs., but Dave will also be offering a lighter (4½ oz.) unit commercially. Undercarriage legs are made from dural tube and the coil sprung noseleg is non-steerable.

Cowl diameter is 8½ ins., furnished with a dummy cylinder ring, to hide the upright McCoy 60 powerplant, which is completely hidden inside. Fuselage depth at the cockpit is 11½ in. and the cockpit interior is fully detailed with cockpit furniture and more dials than we dared to count. The cockpit canopy is 19 ins. long, moulded in $\frac{1}{32}$ in. *Bexoid*. It slides open and shut like the real thing and can also be removed.

Asked why he chose the T-28B as a scale subject, Dave replied that the aircraft is a low wing machine, has trike undercarriage which retracts, and sports a bold colour scheme. He also commented that the success of the first flight with the model proved that such a huge diameter engine cowl need not necessarily be a detriment to flying performance.

Below: the cockpit canopy slides open and shut just like the real thing. The canopy, which is 19 in. long, is moulded in 1/32 in. Bexoid. Note green anti-dazzle patches running along roof of canopy. Two place cockpit is fully detailed as can be seen. Right: designer/builder David Platt connects up aileron servo and retracting undercarriage system, prior to fixing of wing.



WE have already mentioned bird scaring activities using radio controlled models in our April edition but have now uncovered details of similar activities in New Zealand which in fact pre-date those at London Airport.

Auckland, New Zealand ornithologist Mr. E. K. Saul was asked to find a remedy for the bird problem at the new Auckland International Airport. Mr. Saul, of the Wild Life division of the International Affairs department, had been given 18 months to clear away some 10,000 birds which were roosting on the approaches to the main runway before the airfield came into use last November.

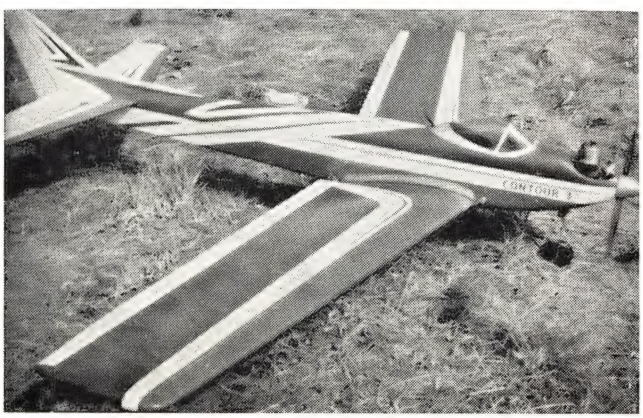
Civil aviation authorities ruled that the birds would be a hazard to airliners operating in and out of the airfield. Mr. Saul's first job was to study the habits of Seagulls, Oyster-Catchers and several other species which found conditions ideal on the mud flats near the airport, where about 160 acres of the Manukau harbour had been reclaimed for the construction of the £10 million airport.

After study, Mr. Saul came to the conclusion that alternative roosts would have to be provided for the birds at Wiroa Island, but the problem was how to persuade the birds to change their digs. Taking a tip from a Maori crane driver, Mr. Saul built himself a kite in the shape of a Carrier Hawk. Birds have an inborn fear of hawks and the kite provided moderate success. Eventually, after contacting a radio control enthusiast it was decided to build a model roughly in the shape of a carrier hawk and some 80 hours was spent building the "hawk" which had its first flight at the airport before a crowd of newspaper reporters, photographers and television cameras, the 69 inch wing span model capable of 40 m.p.h. was literally a roaring success. Birds took off in all directions and within a few weeks the radio controlled hawk, named *Kahu II*, had disposed of 95% of the feathered population. 'Kahu' is the Maori name for a hawk and the "II" is in deference to one or two real hawks in the area—but they cannot be radio controlled!

Canadian Proportional

From the Airfoil newsletter comes an interesting development story of the Canadian *CRC proportional system*, which was used by two members of Canada's 1965 World R/C Championships team.

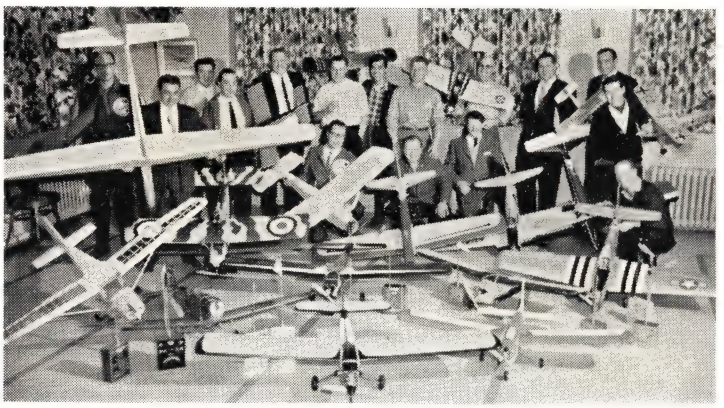
Due to the generally good anti-noise performance of the analog system, this was chosen as the basis for the CRC unit. It was thought that other problems associated with the analog approach could be overcome and development of a triple-tone analog proportional system began seriously in August 1964, when available analog servos did not meet CRC designers' requirements. They consequently devised their own seven transistor servo around a geared *Micromax* motor. The servo, test flown in September 1964 using an Orbit control system, satisfied designers' requirements for temperature and voltage stability, accurate resolution and speed.



Left: exciting model seen at South African R/C Nationals was Jim Connacher's third place Contour II, which displays a 20 degree wing sweep. Brightly coloured model uses South African Constellation 7 proportional radio equipment, and Merco 61 motor with 11 x 7 in. rev-up prop.

As reported in our May "Radio Control World" all R/C events at the last Australian Nationals were won by Tom Prosser, seen near right with class II intermediate model. Model at far right is Tom's class III winner—"Sultifier", a modified Sultan. Attractive bi-plane is the work of Per Eliason, of the Swedish Starfliers club. Merco 61 powered model uses Sampey proportional radio and has ailerons on both upper and lower semi-symmetrical airfoiled wings. Two aileron servos electrically coupled.

Left: radio controlled bird scarer Kahu II being prepared for test flight at New Zealand's Auckland International Airport, where it has been used to clear the area of gulls and other sea birds which were a hazard to airliners operating in and out of the airfield.



Right: group of R/C'ers from Alberta, Canada, with imposing array of radio controlled model aircraft. No two models are alike!

Success of this servo prompted development of the remainder of the system which commenced in October 1964. The prototype was flown in May 1965 and by August that year, when a considerable amount of flying had been done, the servo amplifier was modified to incorporate 8 transistors thereby improving resolution and power to the point where, according to "*the Airfoil*" the characteristics equalled or bettered most Digital systems.

The CRC receiver employs twin deck construction. It is a superhet with three transfilter I.F. stages and the circuit has a total of 17 silicon transistors. Case size is $3\frac{1}{8}$ x $2\frac{1}{8}$ x $1\frac{3}{4}$ in. and the circuit operates from a 4.8v 500 maH power supply.

The transmitter is available with single or dural stick control column configurations. It has a 54 inch base loaded aerial and a claimed minimum output of 500 mW. The 16 transistor circuit operates from a 12v. power supply but will apparently function reliably over a voltage range of 6 to 20v. Total airborne installation weight is 25 ozs. and price of the complete system is $495 (Canadian).

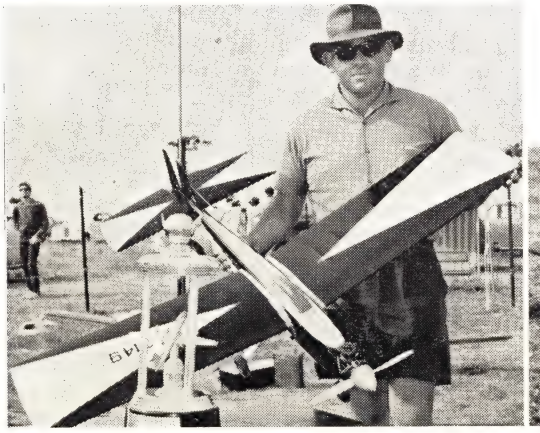
South African Nationals

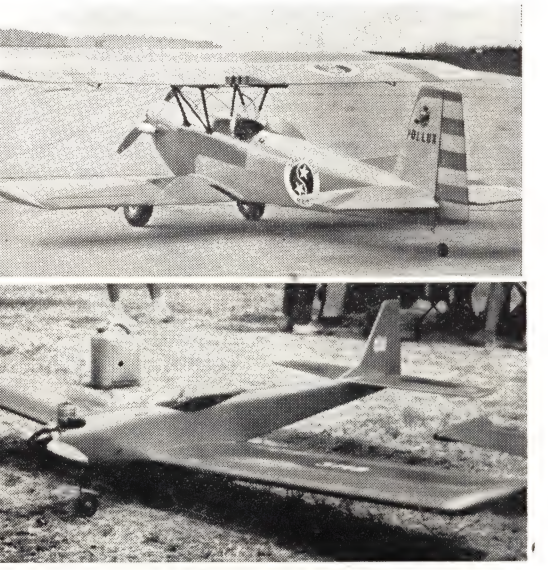
The 1966 South African radio control National Championships was held April 9th to 11th on the custom made flying ground at the Grand Central flying club located half way between Johannesburg and Pretoria. World Championship veteran *Cliff Culverwell* and *Johnny Wessells* set a high standard for the first round closely challenged by *Jim Connacher* and newcomer *Richard Brand*. First round flying finished early and the rest of the day was spent in practice flying and demonstrations including formation flying.

During round two, the following day, Brand managed a highest thus far 3874 point score before R/C activities were interrupted for a full-size aerobatic display by South African champion Nick Turvey, executing 80% of the R/C pattern in a Polish *Zlinn* trainer. This included outside loops executed upwards from inverted.

Round three was the decider and none could match the performance of *Richard Brand* with his *Constellation 7* equipped *Panzer II* original. Second was *Johnny Wessells* with *Bonner Digimite Kwik-Fli* and third *Jim Connacher*, another *Constellation 7* operator in *Contour II* original. All top five competitors used *Merco 61* motor.

Each day of the competition, spectators were given the opportunity to judge a flight. The spectator with adjudged score nearest that accredited by the competition judges won a flip in a full-size Cessna aircraft. How's that for spectator activity!





A NEW COLUMN FOR SINGLE CHANNEL FANS

SINGLE CHANNEL CHATTER

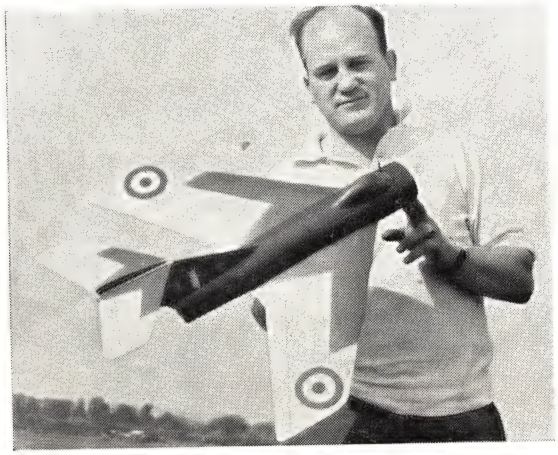
BY BUTTON MAN

Single Channel flying is as dead as the proverbial "Dodo"—anyone persisting in flying in this "Kindergarten" class can only be considered as a second class R/C aeromodeller. After all there is no skill required in flying these simple rudder only models, be a Man and join the multi brigade.

You have, I'm sure read or heard this type of criticism of single channel flyers, usually handed out by some multi enthusiasts who seem to suffer from a superiority complex brought about by their greater outlay of money and greater number of switches to play with. Don't get me wrong, I'm not anti-multi, I fly them myself, but there is room for all types of R/C flying without the need, for the constant bickering and intolerance shown on both sides.

Most clubs inevitably will have both multi and single channel flyers among their members so the sooner everyone realises that there is a lot to be learned from the other person's point of view the better. This column is intended to offer views and comment on single channel development and trends with practical items of interest, all with the aim of improving the standards of building and flying in this class.

Most criticism contains a certain degree of truth and it is therefore worth examining a number of the more prevalent arguments made against single channel flying. Maybe there are faults in this class and if this is the case can we improve matters either on our own behalf or by forcing the manufacturers to supply better or more suitable equipment? If my estimations are correct there are at least five persons with single channel equipment to every one with multi so, rightly or wrongly, this majority should be having a considerable influence in the R/C world and cannot be disregarded lightly. Note that the five-to-one ratio was quoted in terms of equipment as opposed to active flyers because here lies one of the unfortunate facts. Many modellers purchasing single channel equipment for the first time never reach the stage of utilising their equipment in successful flying. There are many reasons for this, some the fault of the manufacturers and some the fault of the owners, but in both cases more could be done to avoid these failures and lead to a larger and more satisfied group of single channel flyers. Perhaps by investigating some of these "criticisms" we can also clear up a few other prejudices at the same time. Let's try.



Left: an example of what can be done with simple single channel equipment. This Cox powered, ducted fan design by Ken Stokes has glass fibre fuselage and sheet knock-off flying surfaces. Uses MacGregor Minimac receiver and Rising actuator.

Criticism 1

Single channel flying is limited to the few days when the weather is ideal and is therefore not worth considering in this country of notoriously bad weather.

Answer

Limited truth here when considering the smallest of models (.020 to .049 cu. in. conventional designs) but the higher powered models with higher wing loadings will fly and penetrate in quite strong winds. It is largely a matter of suitable choice of design and then trimming to the correct incidences, etc., for the weather conditions. Certainly one cannot expect a high wing, slow flying single channel model to cope in high winds, but the advantage with that type of model is surely in being able to fly from convenient small fields at any suitable time without the need to drive for miles to a suitable disused airfield with runways.

Criticism 2

No skill is required to flying single channel models as they are basically only guided free flight designs.

Answer

Absolutely untrue. It requires as much skill to fly a single channel model to its limits as it does with any multi aerobatic machine. This misconception has probably arisen from observing poorly trimmed, underpowered beginners' models which achieved only a minimum of control. Anyone who has watched models such as Basil Murley's *Bazz Bomb* or Ken Willard's *Gasser* being put through their paces will realise that skill is at a premium in executing

manoeuvres that are normally associated with multi-control aerobatic designs. Like Multi models they can be difficult to fly as you wish to make them, but what eventually counts is the skill of the pilot and the amount of practice he is willing to undertake.

Criticism 3

The types of models and flying are limited with only single channel control installed.

Answer

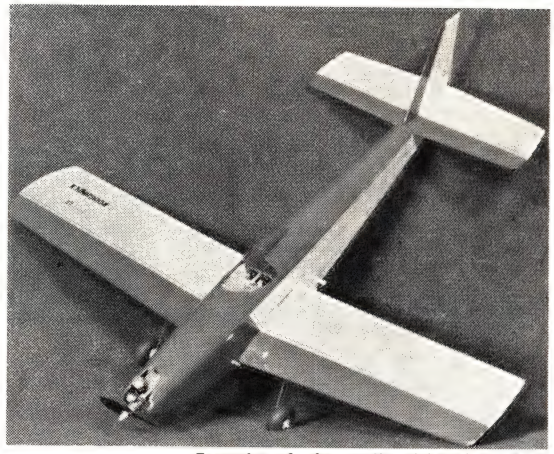
Again untrue. Having been flying single channel for many years now, I consider that I have only scratched the surface of all the possibilities. Agreed, the majority of the models are of the sports high or shoulder wing style but the scope for other types is virtually unlimited. How many of the following types have **you** seen flying with single channel? They are all quite feasible. Canard and Delta design utilising elevons; twin engine models with push or pull layout or a combination of both; models fitted with skis or floats; models fitted with lights for night flying; indoor models; unorthodox designs i.e., swept wing, saucers, tailless, pushers, etc., etc. Add to this all the variations of sports and aerobatic models, high wing, low wing biplane and the numerous scale models suited to single channel operation and some idea of the field can be imagined. There is no reason at all why these ideas should remain "pipe-dreams"—they should be factual and flying. It is not the radio equipment side that is the restricting factor.

Criticism 4

There are only a limited number of competitions that the single channel operator can enter.

Answer

Unfortunately, this is true, and the reason why is a little difficult to understand. Many of the competitions for this class have not been particularly well supported and yet with the theoretical number of modellers one would expect a large attendance to such events. Suitable competitions in recent years have been limited to the spot landing type of competition and even when in opposition with multi models, the single channel operator has an equal chance of winning this type of event. Aerobatic flying competitions, although tried a few years ago, have not been continued in recent years, but, with improved equipment and models, I am sure that superior results could be obtained compared with earlier competitions. Why not an event incorporating



Example of the really lightweight R/C model is Sterling's Lil' Roughneck which spans 22½ inches. Model is suitable for .010—.020 cu. in. motors and the lightest single channel equipment. All sheet structure for fast building.

precision flying plus basic aerobatic manoeuvres?

Pylon racing is also a practical proposition with some of the new equipment and it is hoped to outline suitable rules and designs for this in future months. Many other forms of competition could be arranged and I would be most interested to hear of your ideas to encourage single channel flying. You know, a short time ago it was thought that there was little interest in scale models judging by the lack of participation at organised meetings. But following a less formal "bring your model and meet your fellow modellers" meet, it was realised that this class was very active. Could the same apply to the single channel flyer?

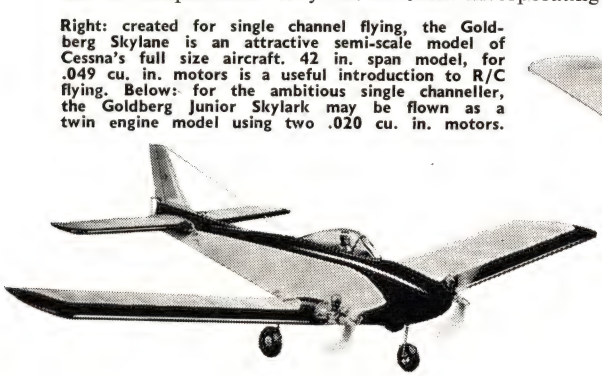
Criticism 5

Single channel equipment is unreliable and outdated.

Answer

This, I suppose, could be considered to be partially true in that the amount of research and money spent on developing single channel equipment has been very much less than with multi equipment—particularly proportional systems. However, if one selects modern equipment carefully from proven designs and manufacturers, little trouble should be experienced with unreliability. Some

Right: created for single channel flying, the Goldberg Skylane is an attractive semi-scale model of Cessna's full size aircraft. 42 in. span model, for .049 cu. in. motors is a useful introduction to R/C flying. Below: for the ambitious single channeller, the Goldberg Junior Skylark may be flown as a twin engine model using two .020 cu. in. motors.



This fine 49 in. span Sopwith 1½ strutter built by Dennis Thumpston, is a past Nationals winner using Rivers Silver Streak 2.5 c.c. motor and single channel Wright carrierwave equipment. Four-year-old model now fitted with Grundig multi equipment.

manufacturers' standards are regrettably lower than is necessary for trouble free operation and the only way to avoid purchasing this equipment is by reading unbiased test reports and hearing at first hand the experiences of modellers who have used the equipment. Regrettable, too, is the fact that many modellers are trying to get results from old obsolete equipment which was probably unsatisfactory when it was new. Not only does this lead to frustrations and disappointments on the flying field but is bad economics in the long run. I am afraid the average aeromodeller must have a mean streak in him which prevents him enjoying his hobby to the full.

Criticism 6

Flying time is severely restricted with single channel models as only one can be in the air at one time.

Answer

There is an increasing number of superhet single channel units on the market, both imported and British made, and these are likely to increase in the future. Also available are tuned filter receivers and matching transmitters allowing up to three models to be flown at the same time without risk of interference. The use of this type of equipment is becoming increasingly important on crowded flying fields associated with large centres of population but there remain many small groups of flyers in rural areas where the normal super-regen receivers allow ample flying time for everyone.

Well, there are some of the pro's and con's of single channel flying. I have not listed all the advantages of lower costs, smaller models, etc., but they should be fairly obvious. That is about enough of the theoretical side for the moment. Next month we will investigate the advantages and disadvantages of the various escapements, motorised servos and single channel proportional servos available commercially. Meanwhile, any suggestions or problems associated with single channel models and flying would be received with interest.

RULES FOR A SINGLE CHANNEL SPOT LANDING LEAGUE

AS USED BY THE SOUTH MIDLAND AREA S.M.A.E.

TO BE RUN ON A HOME AND AWAY BASIS

Model Specification

Any type of R/C model may be used.

All Models to conform to the S.M.A.E. General Rules.

Scoring

One penalty point for every foot away from the spot, up to 150ft. maximum, over this counts as 150.

One penalty point for every second under or over nominated time, maximum time points 150.

First point of contact to count for scoring.

Timing to commence when the model is released, in the case of powered and when the model leaves the line, in the case of the glider.

All models must make a 180 deg. turn round a pylon 100 yds up wind of take-off area. The distance of the pylon may be adjusted depending on weather conditions. Penalty for missing this, 30 points.

Flight Procedure

Maximum flight time 5 minutes.

Minimum flight time 2 minutes.

If the duration should be outside the minimum or maximum time allowed, it will score the maximum time penalty points of 150.

The model may be hand launched, ROG, or tow launched in the case of a glider.

Once the motor has been throttled, it must not be opened up again, penalty for opening up motor, maximum time and distance points. The motor need not be completely stopped for landing, just slow tickover. All models to be released from take-off area including gliders.

All competitors will be allowed two attempts at each flight.

If the model is not released within three minutes of being called, it will be classed as an attempt.

If the flight duration is under 10 seconds, this will be classed as an attempt.

The second attempt must be made immediately, if necessary another member of the same team can be brought forward to take this flight.

If after the second three minutes period no model has become airborne the team will score maximum penalty points (330).

Teams

A team will consist of four members and one reserve. Each team will be allowed 8 flights. No competitor will make more than 2 flights.

One member from each Club will act as judges.

The Home team to provide one measure, two stop watches, one upwind pylon and a landing spot.

The Home team will be responsible for sending in the results to the R/C Comp. Sec.

All team members must belong to the S.M.A.E.

Competitors belonging to two clubs must fly for only one Club all season.

Each club entering a team will pay £1 entry fee. This is to go to providing a suitable trophy. At the end of the season, the club with the lowest total of penalty points will be the winner.

SKEETER

AN N.M.P.R.A. 'GOODYEAR' RACER

BY **E. HERBERT**

¼ size drawings on following pages

SKEETER is one of the earliest full-size Goodyear racers and was originally named *La Jollita*. Although never the fastest, it has always been admired for its perpetual good looks, throughout the many modifications it underwent at the hands of successive sponsors.

It is still, in the opinion of many people, one of the prettiest of the 190 cu. in. displacement racers, blending as it does, the practical approach of a *Wittman* design with the scientific lines of a *Cosmic Wind* or *Shoestring*.

Skeeter is presented here in its 1951-52 form, in which year its Goodyear Race qualifying time was 181 m.p.h. However, it was eliminated in the second head.

The Model

Construction is fairly simple, but great care must be taken to save every ounce of weight, particularly at the nose. The original weighed just 5 lbs., the overweight being due mainly to a heavy finish and 2 ozs. of ballast at the tail. The minimum weight of 4½ lbs. should be achieved, since speed and flying characteristics deteriorate with every excess ounce.

Citizen-Ship APC proportional radio equipment was used in the prototype model in both three and four servo models. The four servo system was finally standardised, since the mechanically coupled rudder/aileron arrangement of the three servo system would result in slight trim changes if the wing shifted.

The model drawn here is as near as possible to exact scale. The engine is radially mounted to a ¼ in. ply former and held onto the fuselage with rubber bands. I have used this system for many years now on all sizes of engine and would not, through choice, use any other.

Wings are held on by internal rubber bands on "S" hooks between ¼ in. dowels. They are strapped on very tightly, but still give a little in a heavy landing. Bolts, Dzus or Camlock fasteners may be used easily and are advised if the mechanically coupled rudder/aileron system is used. Do not eliminate the glass fibre reinforcement inside the fuselage from the firewall to aft of the wing.

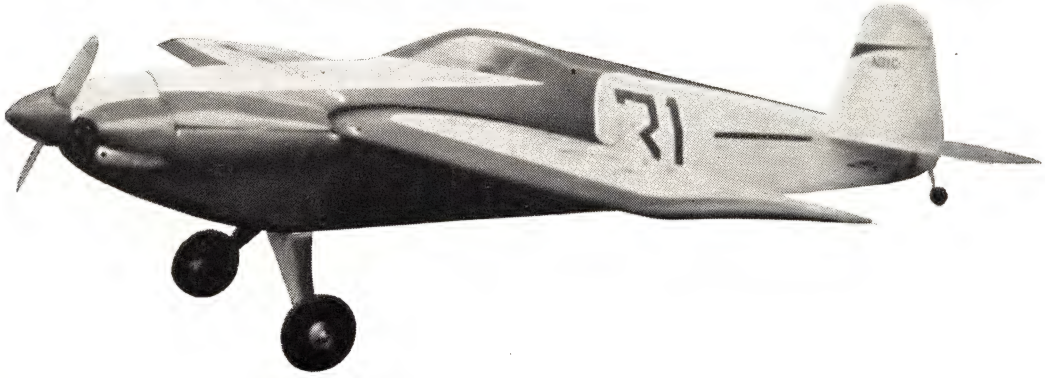
The cowl cheeks and cockpit canopy moulds were made from 3 x 2 x 30 in. soft balsa block, but may be easily built up from ½ in. sheet, especially if the scale shape is modified slightly. The specially shaped spinner is a must if the character of the full-size aircraft is to be retained. The cone and nosepiece was "turned up" in a ¼ in. electric drill. The balsa was then covered with tissue and coated with balsa cement before painting.

First flight is likely to be a somewhat nerve shattering experience as there is little inbuilt stability, since the full-size machine was intended to have a high rate of roll.

To tame the model, reduce control surface movements below those shown if possible, as tight turns are not required during the testing stages. I do not advise flying on ailerons only, as recovering from a turn is much improved by a coupled rudder. Be sure that the airframe is absolutely true since at the flying speed of this model a warp is invariably fatal. The engine has 3 deg. downthrust and 2 deg. right.

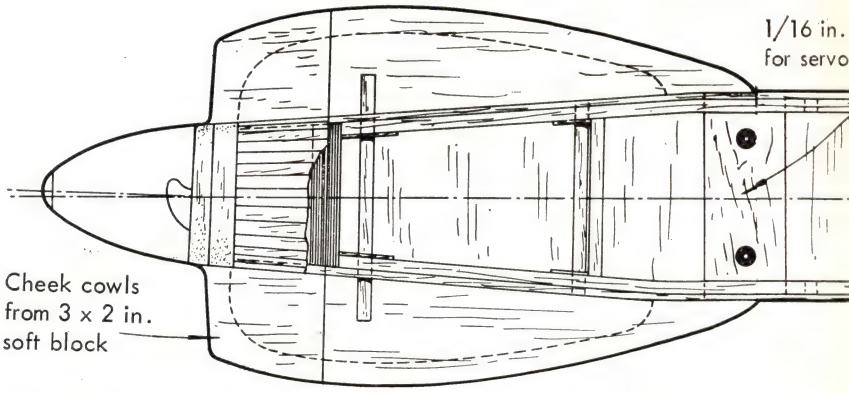
Take-off procedure for this and another similar model, is to set the rudder about ¼ in. over to the right (by control column, not trim—assuming you have proportional control) and the elevator about ¼ in. up. As the model accelerates, gradually centralise the rudder and if the model does not lift by itself, ease in some up elevator after a run of about 100 ft. depending on how long the model takes to gain speed. Hold that elevator setting as the model rises and concentrate on directional control. Maintain a straight heading and gradually neutralise the elevator, but do not commence a turn below 150 ft. altitude.

(*Continued on page* 354)

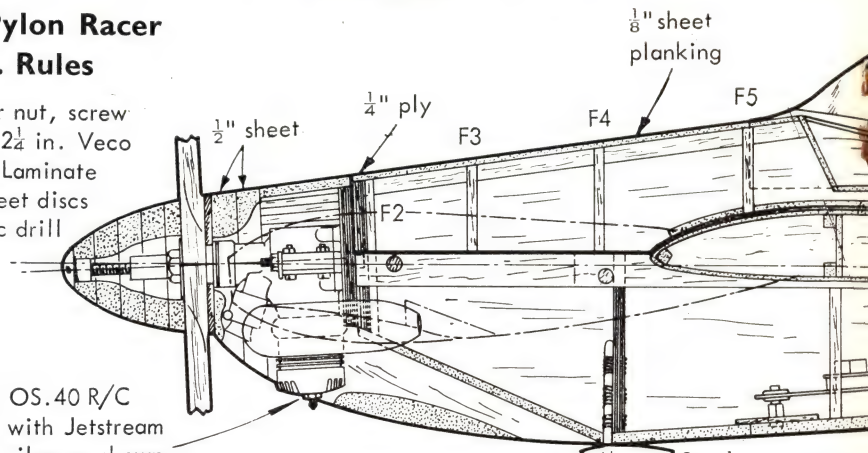


Skeeter

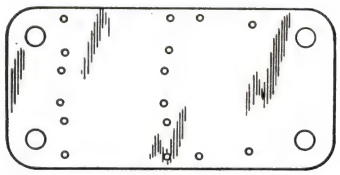
"Goodyear" Pylon Racer to N.M.P.R.A. Rules

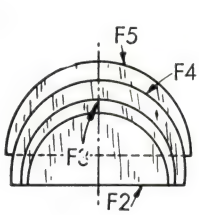


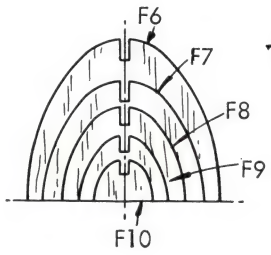
Backplate, adaptor nut, screw and nose cap from $2\frac{1}{4}$ in. Veco standard spinner. Laminate cone from $\frac{1}{2}$ in. sheet discs and turn in electric drill

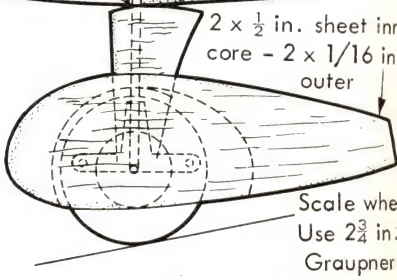


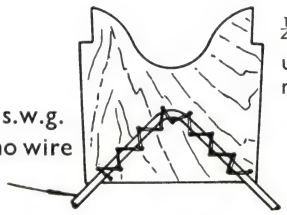
Servo mounting plate

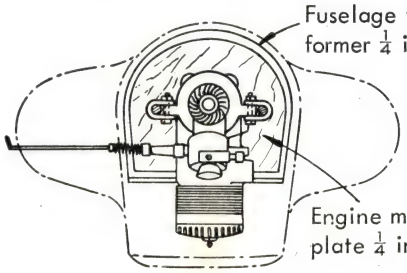


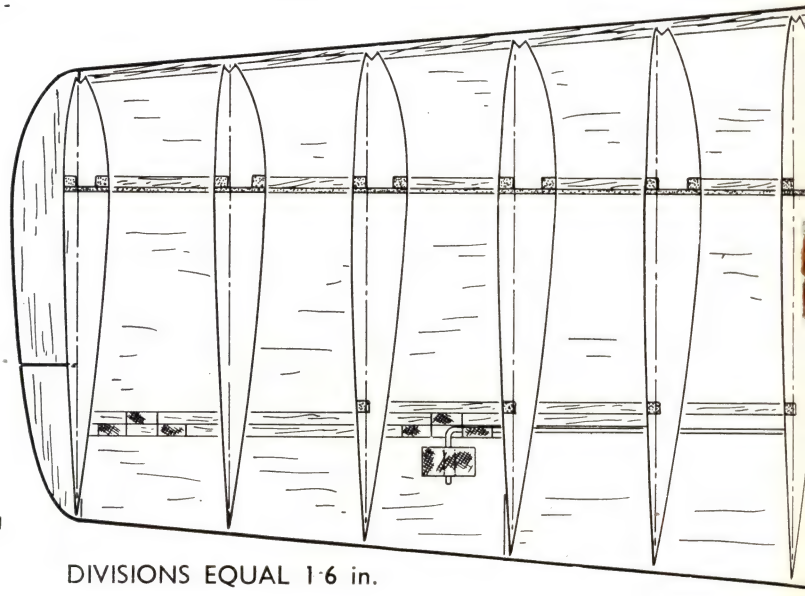












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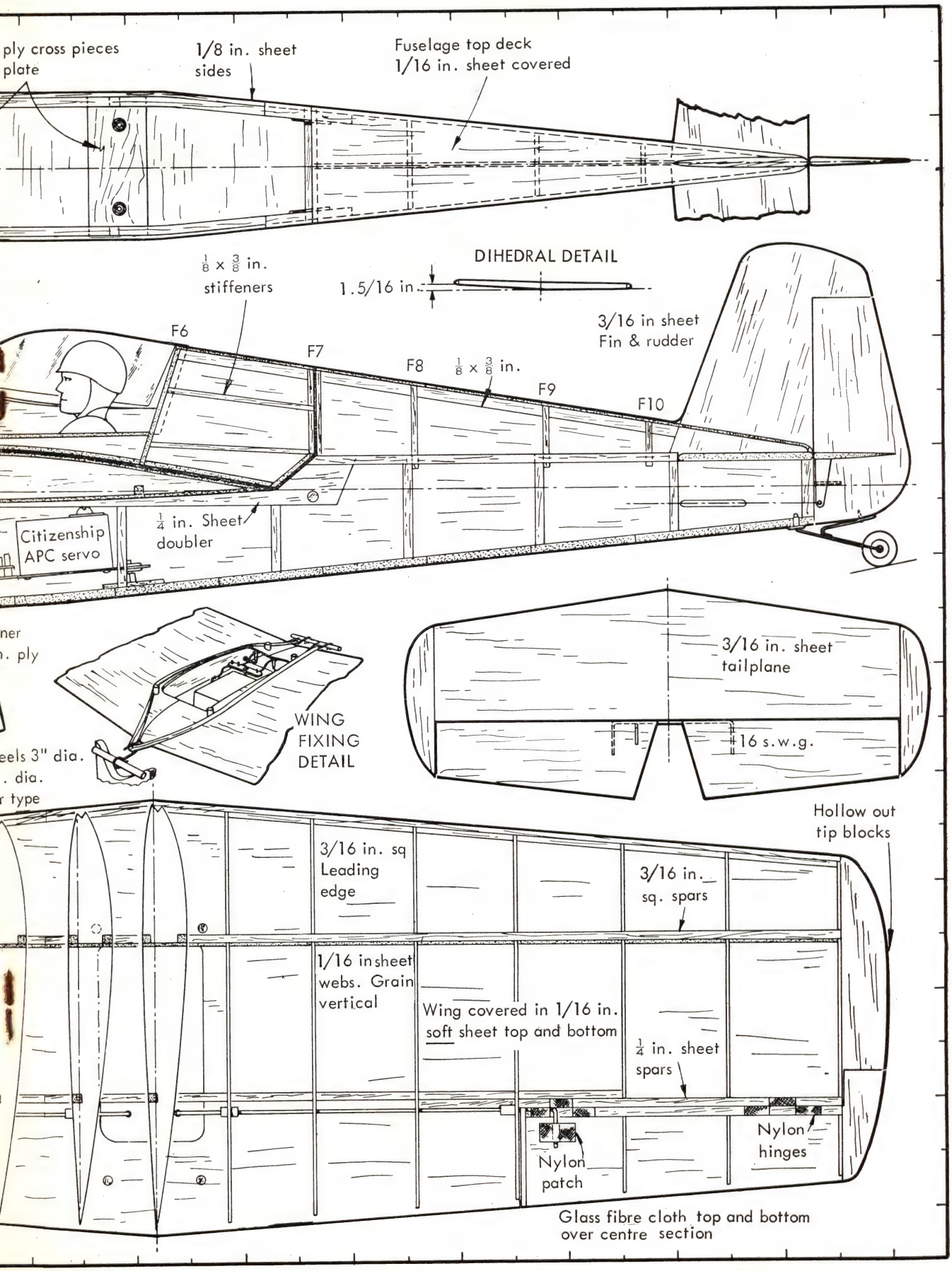
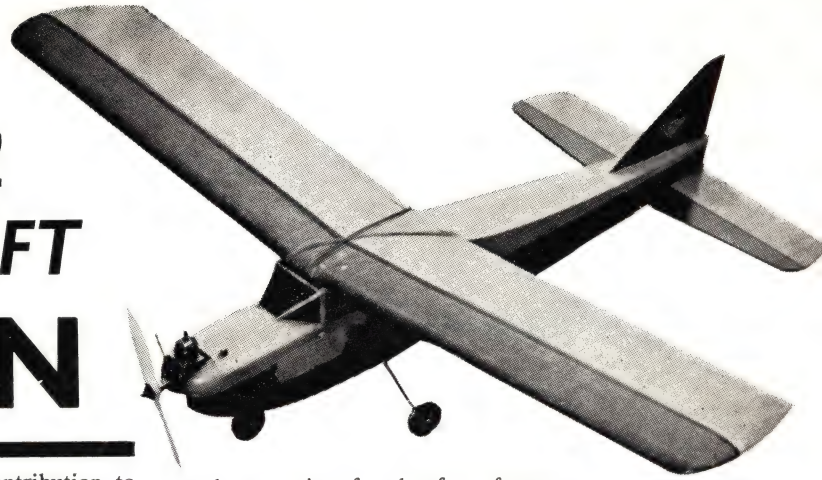

ply cross pieces
plate
1/8 in. sheet
sides
Fuselage top deck
1/16 in. sheet covered
DIHEDRAL DETAIL
1.5/16 in
1/8 x 3/8 in.
stiffeners
F6
F7
F8
1/8 x 3/8 in.
F9
F10
3/16 in sheet
Fin & rudder
Citizenship
APC servo
1/4 in. Sheet
doubler
WING
FIXING
DETAIL
3/16 in. sheet
tailplane
16 s.w.g.
Hollow out
tip blocks
3/16 in. sq
Leading
edge
3/16 in.
sq. spars
1/16 in sheet
webs. Grain
vertical
Wing covered in 1/16 in.
soft sheet top and bottom
1/4 in. sheet
spars
Nylon
hinges
Nylon
patch
Glass fibre cloth top and bottom
over centre section

R.C.M.&E. KIT REVIEW No. 2

KEIL KRAFT GYRON



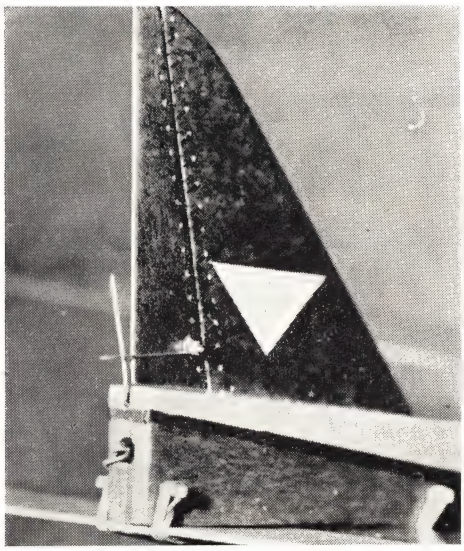
THE Gyron is Keil Kraft's latest contribution to the R/C hobby. Designed by Dave Platt, this is a 36 in. span high wing model for single channel radio equipment and .049 cu. in. power plants and features all sheet construction for building simplicity with a minimum of building time. Gyron is very much a functional design, although it does have a measure of chunky attractiveness.

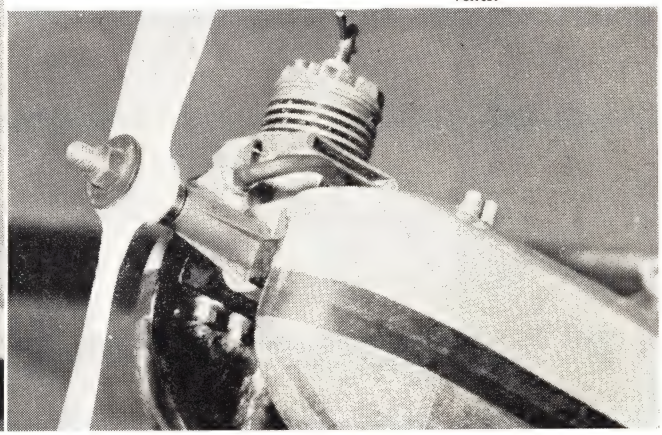
The kit is very extensively pre-fabricated. For this reason, the usual full-size plan which most kits contain, is not really necessary, and is accordingly replaced with a series of detailed stage-by-stage building sketches on an instruction sheet. Kit contents are comprehensive, including wheels, formed wire trike undercarriage, hardware, three colours of tissue, transfers and fuel tank. Balsa in the sample received was of medium grade, and in no cases was substitution of parts required. Die-cutting was accurate, but for the most part, did not cut right through the sheets, necessitating some extra knife work, on both balsa and plywood sheets.

Construction was definitely fast, simple and straightforward, and would appear to present no difficulties for the absolute beginner likely to be attracted to this model. Wings go together very easily indeed. Rib and spar positions are printed on the bottom sheets, so that the ribs, leading and trailing edges were glued in position accurately without the necessity of a plan for reference.

The only real point of criticism concerning construction relates to the fuselage wing seating since neither of the formers at front and rear of the cabin have "V" cuts at the top to receive the dihedralled wing. This can be easily remedied, but an alternative cure is to add $\frac{3}{16}$ x $\frac{1}{8}$ in. balsa rails to the top of the fuselage side where the wing sits. A misprint on the plan indicates that one wing panel should be flat on the building board and the other propped up $1\frac{1}{2}$ in. to set the dihedral angle. In fact this should read 3 in. to provide $1\frac{1}{2}$ in. under each wing tip.

The instructions suggest installation of actuator and motor during early stages of fuselage construction. Although adequate protection of these units can be achieved, we preferred to leave these off the airframe until after completion. This was arranged by soldering (Araldite can be used) the engine mounting nuts to a thin metal plate, glued to the rear of the front bulkhead. This also allows side thrusts adjustment on radially mounted engines. Escapement installation is on slide rails, although, providing a small screwdriver is used, there is room to mount the escapement to a fixed bulkhead. In uncovered state, with motor, but less radio equipment, the model weighed 15 ozs., and final, ready to fly weight was 22 ozs., against the 20 ozs. quoted by the Plan.



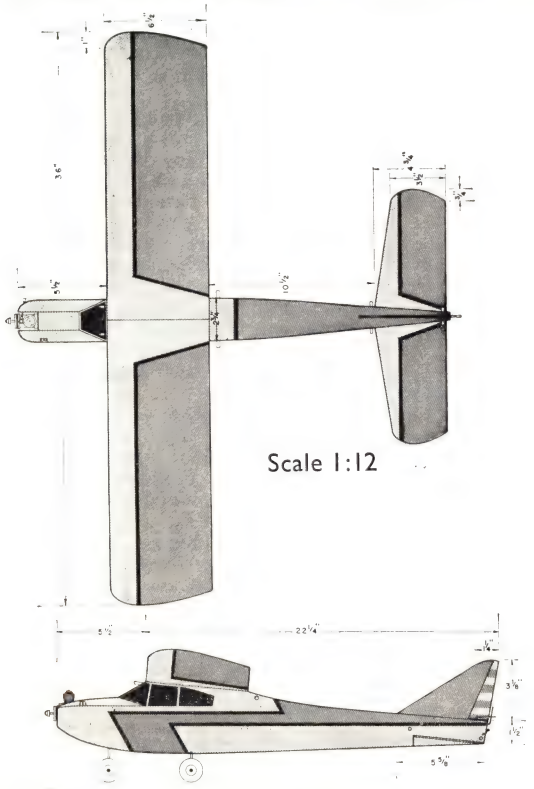


Left: rear end detail, showing rudder linkage with torque rod and yoke. Note thread hinge. Below: view of nose section showing Frog 80 motor. Note fuel tank vents.

Flight Tests

The model was equipped with a *Raven* single channel tuned filter radio set (as tested last month), which obtained power from three *U7* sized pen cells contained in a battery box. Escapement was an *Elmic Conquest,* and power plant installed was a *Frog 80.*

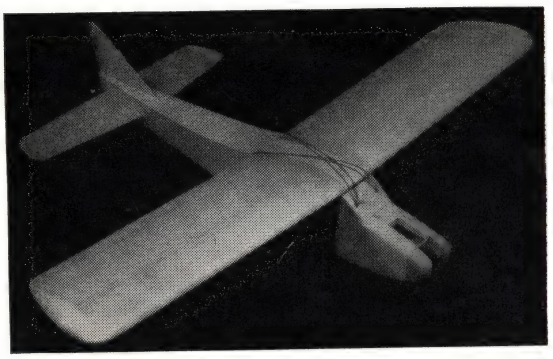
C.G. position corresponded with that indicated in the instructions, so after radio checks, test glides commenced, suggesting a slightly under elevated trim, but with no turning tendency. The slight under elevation was confirmed by the first powered flight, which also produced a right turn. A strip of $\frac{1}{16}$ in. packing under the tailplane leading edge and a touch of left rudder trim set the model ready for the next, fairly fast launch, and produced a steady



climb trim, although the right turn persisted, requiring continual left rudder corrections to prevent a right spiral. So many left rudder corrections were required that the rubber escapement motor eventually wound down. The strength of the Gyron was demonstrated in the inevitable spiral dive, which resulted in practically no damage.

For subsequent flights, with escapement rubber well wound, a small extra left rudder trim correction was made and a little of the packing over the tailplane leading edge shimmed away. This proved correct for calm weather flying but for windy conditions the amount of packing would have to be reduced.

The *Frog 80* is not an excessively powerful motor for the Gyron, since the model flies best at high speed. Flight characteristics deteriorate at slower speeds and a "hot" .049 motor seems the best choice.



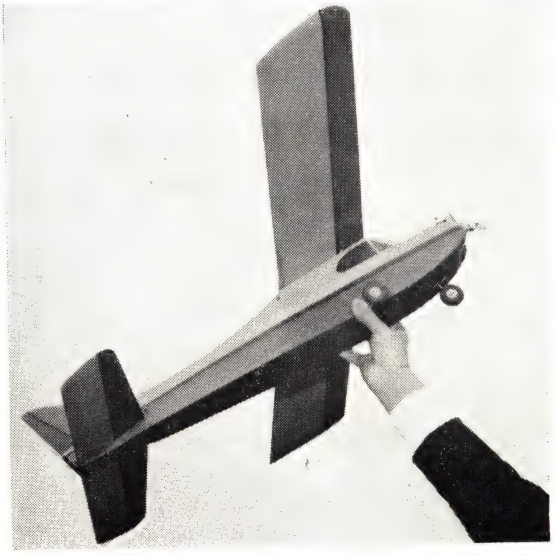
Above: the Gyron airframe in uncovered state showing all sheet construction. Below: our completed Gyron, displaying attractive blue, black and yellow tissue colour scheme.

Rudder control is positive. If held for a turn of 90 deg. or more the nose drops quickly. In fact recovery from a right hand spiral dive can only be achieved by applying opposite rudder, and the reason for this can be traced to the flying surface incidence angles—or the wing 5 deg. positive and for the tailplane $5\frac{1}{2}$ deg. positive—and engine sidethrust.

Sidethrust on the review model was approximately $1\frac{1}{2}$ deg., which should not be exceeded for any but the most powerful .049s. Providing the rudder is not held on continuously, a left turn may be maintained without losing height. Rudder control is less effective on the glide, but is still definitely adequate. The spiral dive characteristics are not ideal for beginners, but do allow more proficient fliers the possibility of some lively aerobatics. The Gyron will execute snappy barrel rolls from a three-quarter turn in either direction. Loops were not possible with the review model, but a little more power would probably carry the model "over the top".

Conclusions

The Gyron is rugged, and capable of withstanding the many hard knocks which, at the hands of the novice pilot, it can expect to receive. From the beginner's angle it does not compare with stablemates *Super Sixty* and *Mini Super* for inherent stability and forgiving characteristics. But for more ambitious single channel fans, it should provide some sporty flying in most weather conditions.



R.C.M. & E. KIT REVIEW No.3.

STERLING DENIGHT SPECIAL

Our Sterling Denight test model shown here is also this month's cover subject. Model was finished in red, white and black MonoKote, which added 6 ozs. to the total airframe weight.

WHEN we first received our Sterling Denight Special kit from *Enterprise Model Aircraft Supplies* we were extremely enthusiastic to "have a go". The Denight is a Goodyear pylon racer to N.M.P.R.A. rules and is a semi-scale model patterned after the full scale 190 cu.in. racer designed by the late "Bart" Denight. Sterling's model was designed by *Joe Martin*, a Californian, who won the first ever miniature Goodyear event using the prototype model equipped with six reed equipment *Min-X* and *K & B 35* power. Joe showed the way around to all the proportional boys at this first N.M.P.R.A. Goodyear event, with a beautifully trimmed model.

Sterling's kit took just nine weeks to engineer and became available last autumn. Our kit featured good wood throughout and clean die cutting with no crunchies. The front fuselage top decking is supplied spindle-moulded and hollowed and the lower nose block is also shaped. The dural undercarriage is ready shaped, while wheel pants and cowl blisters are half mouldings in plastic.

Construction was commenced with the wing and was an easy task, thanks to the flat bottomed wing section, which also helped to build a wing completely free of warps. The wing is completely sheeted in $\frac{1}{16}$ in. balsa, which according to the manufacturer is "straight lined ripped" so that all sheets butt join correctly without any extra work. It is very nice to be able to substantiate this claim, for all sheets did in fact mate without any work along the edges. One disappointment concerned the wing tip blocks which were roughly shaped undersize and had to be built up around the edges to obtain the correct outline. The ailerons are outboard, inset types, hinged along the centre line and are solid balsa.

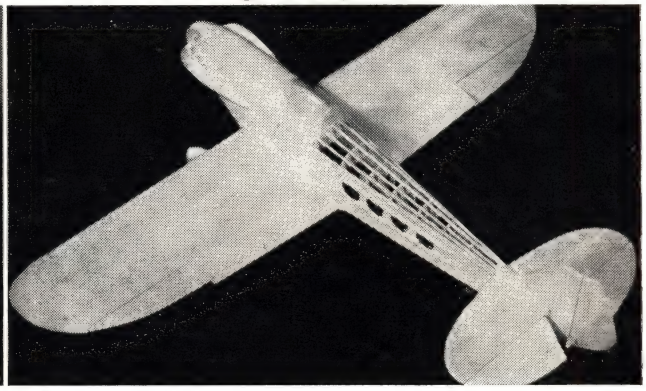
The fuselage has two basic side sheets. Doublers and stringers are cemented to the outer faces, so that when the model is covered, the scale stringered effect is maintained at the rear end. The basic side sheets are also relieved with circular holes to prevent the rear part of the fuselage from becoming too heavy. Fuselage assembly is not difficult but care should be taken to ensure correct alignment.

The real problem encountered in construction concerned the wheel pants, which are vacuum moulded in halves, along with the cowl cheeks. When removed from the plastic sheet, with $\frac{1}{8}$ in. excess around the perimeter, the halves tended to bow out at the ends, so that it was impossible to draw two halves together for joining. Eventually the problem was solved by contact cementing a balsa backbone around the inner edge of each half, and thereafter joining. Other Denight Special builders we have met also encountered this problem and also discovered, as we did, that the axle bolts cannot be bolted to the dural legs complete with wheels and pants, without drilling a hole in the outside face of each pant, in order to pass the bolt.

Cheek cowls were no real problem, although care should be taken contouring the edges to fit snug around the nose section. Remove the excess material a little at a time. We secured ours in position with balsa pieces contact cemented along the inside edge, to provide enough cementing area for a rigid setting.

When complete, the airframe, minus radio, but with *O.S.40* motor installed, weighed 3 lbs. 2 ozs.—so that the model was unlikely to turn out at the N.M.P.R.A. minimum racing weight of $4\frac{1}{2}$ lbs. which was disappointing. The model was covered in red *MonoKote* with black and white trim, which added only 6 ozs., and with *Orbit 3+1* radio installed, weighed $5\frac{1}{2}$ lbs. ready to go.

Below left: spill of components from the Sterling kit. Note shaped balsa parts, formed dural undercarriage, cockpit canopy, and in the foreground, wheel pants and cowl cheeks in Acetate sheet. Below: the bare airframe, showing fully sheeted wing and stringered fuselage rear end.



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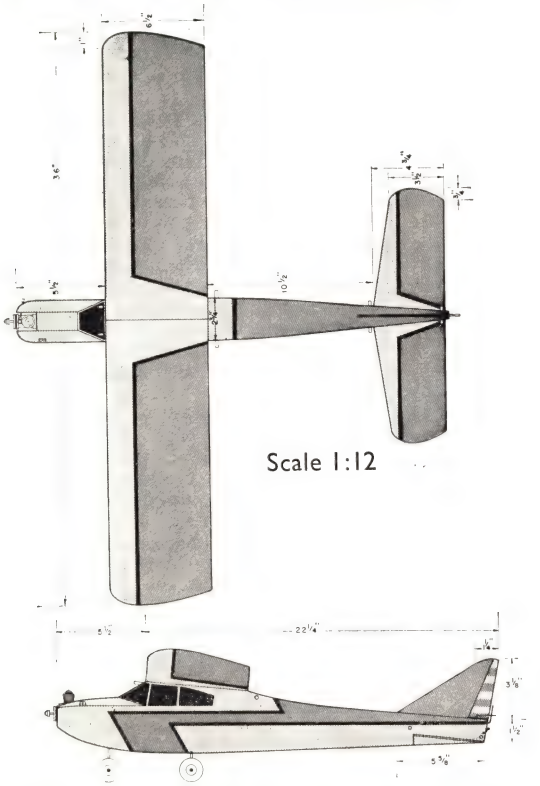

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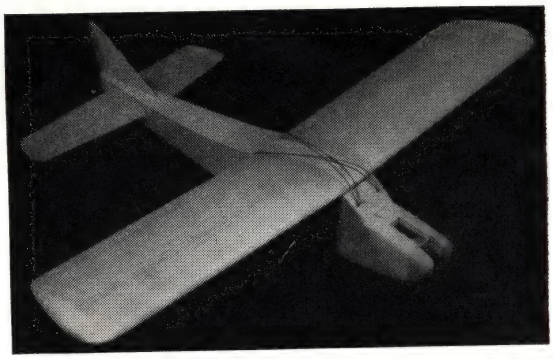

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When complete, the airframe, minus radio, but with *O.S.40* motor installed, weighed 3 lbs. 2 ozs.—so that the model was unlikely to turn out at the N.M.P.R.A. minimum racing weight of 4½ lbs. which was disappointing. The model was covered in red *MonoKote* with black and white trim, which added only 6 ozs., and with *Orbit 3+1* radio installed, weighed 5½ lbs. ready to go.

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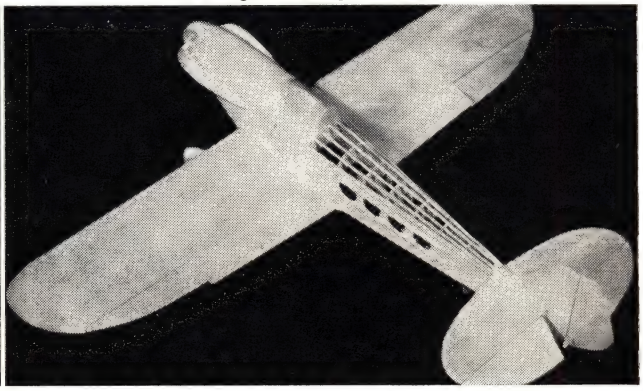
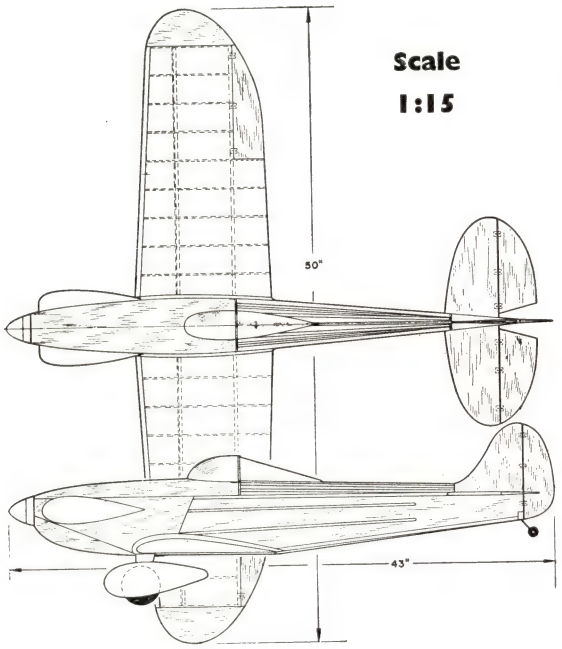


Flying

The *Orbit 3+1* radio was installed with four servos, to provide full house control, with continually coupled ailerons and rudder (no rudder cut-out mode). Just to give it that extra bit of class, we polished the *MonoKote* finish with Turtle Wax car polish.

During the rather lengthy construction stage of this model we had become rather perturbed by the possible flying characteristics, which the Grape Vine suggested Goodyear racers, and the Denight Special in particular usually possessed. In fact, one American serviceman had as good as bet that, Ole Sky King the Editor would not be able to handle the little beast he was busily creating. Consequently, we were a little put off, until witnessing a magnificent performance by another Denight Special at the local field. This model had reed radio equipment, an *O.S.40* motor and weighed 5½ lbs.



Nevertheless, when the time came to fly, we were still very worried, and turned over the flight tests to the local "ace". Our *O.S.40 R/C* from *Keil Kraft* had received no running prior to installation, and we had intended to run a few tank-fulls through it on the field. We did—but in the air, thanks to the enthusiasm of our test pilot, and very well the motor performed. First flights are always an unknown quantity, but from low speed release, our Denight ran down the runway absolutely straight, and lifted into a magnificently smooth take-off. Climb rate was high, and the model was quickly 'up stairs' performing loops, rolls and split esses at a high rate of knots. In fact our test pilot was so enthralled that it was difficult to get the Tx. off him. After a ten or twelve minute flight, during which the *O.S.40* ran flat out, without a sign of overheating, the motor was throttled back, and the model taken down wind for a long flat approach to land. The motor idled perfectly all the way down, and cut after the model had landed.

On the second flight, the landing was not so successful,

DESIGNER AND PROTOTYPE. Joe Martin poses with the original Denight Special, here finished in bronze and cream with black separation line. Model won first-ever Goodyear event in California.

terminating in an uncontrollable flop into the ground when the model has been slowed up too much on the glide. This is something that must be watched, as the stall is very abrupt, and once the model is stalled out on approach you might as well switch off the transmitter for all the use it is! Subsequent flights proved this model to be a real fun machine, with plenty of aerobatic ability. Elevator movement was reduced, and ailerons given greater throw than we had originally considered necessary.

Unfortunately, our Denight came to a most devastating end during attempted inverted flight. The model was rolled to inverted attitude and held there with a little down elevator. She ran absolutely straight and was soon running away from us. But on application of left turn signal, the model was very loth to turn, and responded with a very wide arc, to the point where it was difficult to see which way it was going. The ensuing prang demolished the model, damaged the receiver, smashed the battery pack and mutilated the *O.S.40* almost beyond repair. Bits were everywhere on the 15 ft. wide piece of concrete which was the only hard surface in about a whole square mile of country! Possibly a better pilot could have saved the day, and we are bound to admit a certain amount of finger trouble, but it was not until an hour after the disaster that we realised that with coupled aileron and rudder control, the rudder might perhaps be working against the aileron control when the model is in inverted attitude. Hence the unwillingness of our model to turn!

Summarising; the loss of our Sterling Denight Special was something of a heartbreak, and when one can say that about a model then it is definitely a good one.

Our test model caught in action on perfect maiden flight, passes low over the runway, with O.S.40 motor providing plenty of power. Test pilot R. C. Grimmett at the transmitter.

Peter Chinn's

Radio Motor development & performance Commentary

Better Small Engine Throttling

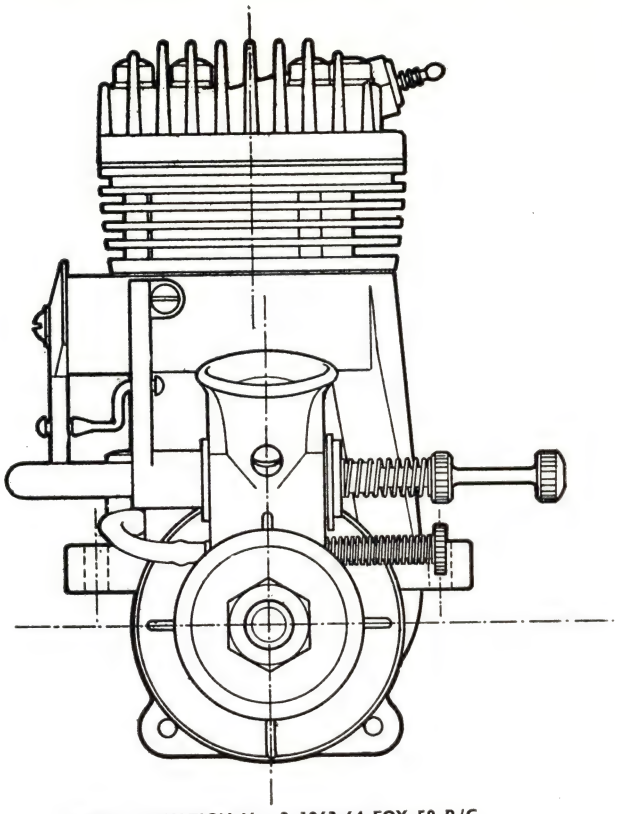
THE popular forms of model aircraft radio control in the U.K. now appear to be fairly firmly divided into two groups: simple single-channel and multi. There does not seem to be much interest in multiple controls operated off single channel—such as the cascaded escapement systems of a few years ago.

For the majority, single channel usually means a simple model, sometimes with throttle control, but more often with rudder only, although, even when throttle control is not used, many people have preferred to employ compound escapements so as to achieve selective, rather than sequential, rudder control. However, according to those "in the know", escapements, for all except the lightest and simplest models, will eventually give place almost entirely to the new breed of single channel compound servos as typified by the *RMK* "*Dynamite*" and *O.S. Minitron S-101.*

As is generally known, this type of servo gives selective left and right, plus a third position for bringing a motor control servo into operation, the appropriate matching servos being the *RMK* "*Dynamo*" and *Minitron S-101M.* Each of these offers a sequence of three throttle positions: high-speed for take-off, climb and aerobatics, medium speed for cruising flight and idle for landing, but we are now faced with the question: can such a servo system be fully utilised with existing "single channel" type engines?

It has to be admitted that small R/C engines, in general, and particularly those in the up to 0.10 cu.in. group, have a relatively poor throttle performance when compared with the big "multi" engines. The majority of these small R/C engines are, basically, standard type motors to which a simple throttle valve has been added. It is not unusual to find that their "idling" speed is five or six thousand r.p.m. (much too fast to allow engine-on landings unless the model is excessively underpowered) and/or that they are virtually "two-speed" engines and lack a reliable "middle-speed" that can be used for normal cruising flight. Moreover, they are sometimes rather lacking in power, especially when restricted by both a throttle type carburettor and a silencer. These complaints apply, in varying degrees, to most British, American and Continental engines at the present time and to both glow engines and diesels. The exceptions, at the moment, seem to be found only in Japan.

Why should the lead come from Japan? The reason, we suggest, is in the enthusiasm with which single-channel is still pursued there. Despite much progress in multi-channel and an abundance of good multi equipment, both reed and proportional, single-channel has continued to flourish and, in some respects, has progressed beyond the levels reached in the U.S. and Europe. Japanese multi gear is not cheap and is probably even a little further beyond the average modeller's means than is the case with multi in the U.K. This may well account for their readiness to tackle quite ambitious single-channel projects often incorporating aileron or elevator control, plus engine throttle and leading, in turn, to a demand for more complex servo systems and for small motors (3 to 4 ounces weight) having more of the attributes of a good multi engine.



FRONT ELEVATION No. 3 1963-64 FOX 59 R/C.

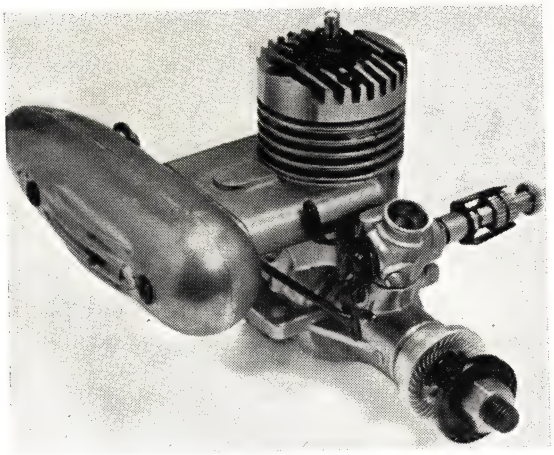
The improvement in small R/C engines that is taking place in Japan was brought home quite clearly, recently, when we had on test the 1.62 c.c. *Enya 09-III-TV* and the 1.75 c.c. *O.S. Max 10 R/C.*

The Enya, a throttle-equipped version of the recently introduced standard *09-III* model, is the most powerful R/C engine, of this size, that we have encountered to date and combines this power with a notably good throttle range. We shall be dealing with this motor in greater detail in a future article. (*See* AEROMODELLER, *June*, *'66 Engine Test.*)

The existing *Enya* silencers, incidentally, do not fit the *09-III*, but the manufacturer will, presumably, offer a silencer for this engine in due course.

O.S. Max 10 R/C

The *O.S.*, which was designed as an R/C engine at the outset and has not, so far, been made in a standard non-throttle version, did not achieve quite such a high specific output, on test, as the *Enya*, but is still somewhat above average in power and particularly so for an engine weighing only a little over 3 oz, or less than 4 oz complete with silencer. Where it really scores, however, is in its throttle range. On test, our sample ticked over as low as 2,000 r.p.m. on the bench, quite reliably, on the bigger prop sizes and, on a fast 8 x 4 or 8 x 3½ (which are sizes well suited to the engine), a steady idling speed of 2,500 was achieved without difficulty. The throttle was also found to be fairly progressive and the engine was quite happy when set for any intermediate speed—i.e. there was



no tendency for it to richen up or lean out when set for a "half throttle" cruising speed.

The *Max-10 R/C* is designed to take either of the small size *O.S. Jetstream* silencers, i.e. the standard "S" type, or the "*R/C-S*" which has a built-in semi-rotary restrictor for coupling to the carburettor throttle. We used the standard silencer and, with this, an *O.S. No. 7* idle-bar plug and our standard 5 per cent nitromethane R/C test fuel, we recorded the following prop/r.p.m. figures:

7,900 rpm on 9 x 4 Top-Flite (nylon)
9,700 rpm on 8 x 5 Power-Prop (wood)
10,000 rpm on 8 x 4 Tornado (nylon)
11,100 rpm on 8 x 4 Power-Prop (wood)
11,900 rpm on 7 x 4 Tornado (nylon)
14,200 rpm on 7 x 3 PAW (wood)

We also checked the engine without the silencer and discovered that rather less power (only about 5 per cent in fact) is absorbed by the *Jetstream S* Silencer when it is fitted to this engine, compared with the 15 and 19 engines so equipped. The handling characteristics of the *Max 10 R/C* were very pleasant. Starting, hot or cold, throttle open or closed, was simple and straightforward. The use of the silencer did not complicate starting in any way.

Although the larger O.S. engines, from the *Max-III 15 R/C* upwards, all feature both an airbleed adjusting screw and a stop screw to limit throttle barrel movement, neither of these are fitted to the *Max-10 R/C*. The absence of an airbleed screw we found rather surprising but, after trying the engine, came to the conclusion that it had been omitted for the very good reason that the engine worked perfectly well without it. The omission of the stop screw, on the other hand, we found difficult to justify. The carburettor body actually has a lug cast into it which, one imagines, was originally intended for a stop screw. This could have been arranged to engage a slot in the throttle barrel in the usual way, to permanently establish the full-open position and, at the same time, provide an idling adjustment. Instead, there is a fixed screw engaging a peripheral slot in the throttle barrel, which only serves to locate the barrel in the carburettor body, making it necessary to establish the throttle limits with the servo linkage.

In all other respects, the general design and construction of the *Max-10 R/C* is closely related to other recent O.S. R/C engines and to the *Max-S 30* in particular. Unlike the 15 and 19 models, it uses a unit crankcase/cylinder/bearing casting with drop-in cylinder liner. The front end has a cast-in phosphor-bronze bush to carry the counterbalanced, hardened crankshaft, which has a 9 mm. journal, allowing a sizeable (6.5 mm. bore) gas passage. The rotary-valve stays open for 185 degrees of crank angle, closing at 45 deg. ATDC Exhaust and transfer periods, as measured on our test engine, are 126 and 106 degrees respectively.

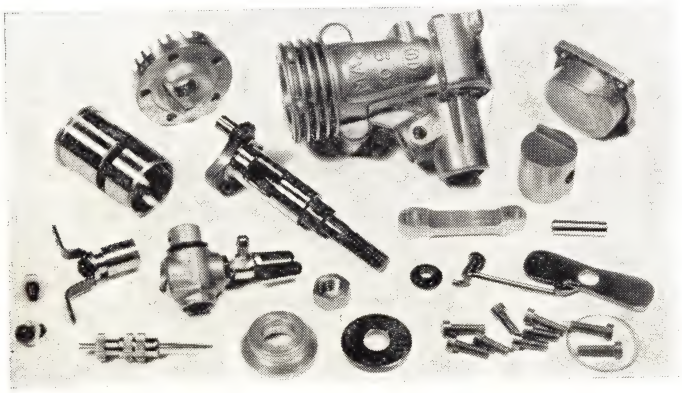
The *Max-10 R/C* is a trifle bigger than the low priced *O.S. Pet 09 R/C* engine and, with a bore and stroke of 13.4 x 12.4 mm., has a slightly larger piston displacement, but weight is still very modest at 3.2 oz., or 3.8 oz with the standard silencer. The engine is very well made and should give plenty of useful service.

Enya 60-II TV

The Enya 60-II TV (and its non-throttle equipped *60-II* companion model) was introduced just over a year ago, succeeding Enya's previous 60, a very solidly built plain bearing, lapped-piston engine that had been in production since the early fifties.

The new model has all the features of a modern R/C multi power unit but, in the true Enya brothers' tradition, exhibits an individual approach to detail design. It retains, for example, the familiar Enya layout involving a detachable front bearing housing and, setting an example which may well be followed by other manufacturers, has its piston bosses bronze-bushed against the rapid wear that has become a common complaint with aluminium pistons in big R/C engines.

The *Enya 60-II TV* was released, simultaneously, in Japan and the United States last summer. We received one at the same time. Almost immediately, we had reports from the U.S. that the engine was tricky to handle. Our own engine had a habit of starting backwards or of back firing and kicking its prop loose. *Ralph Brooke's*, allegedly, threw its prop off in the air and would also reverse direction when idling. (Incidentally, this was just before the 1965 U.S. Nationals and Ralph was experiencing an unprecedented succession of engine troubles, partly due, it seems, to the fact that his inverted engine layout placed the tank quite a bit higher than the needle-valve and caused the engine to load up during the idle. He also had trouble with three *Fox 59's* and a *Veco*



Above: the new O.S. Max 10 R/C engine of 1.75 cc. displacement with O.S. Jetstream silencer and extension adaptor. This virtually establishes a new standard of throttle performance for small, lightweight R/C engines.

Left: parts of the Max 10 R/C. Virtually a scale-down "multi" engine, the Max 10 was designed exclusively for R/C work with the new single-channel servos.

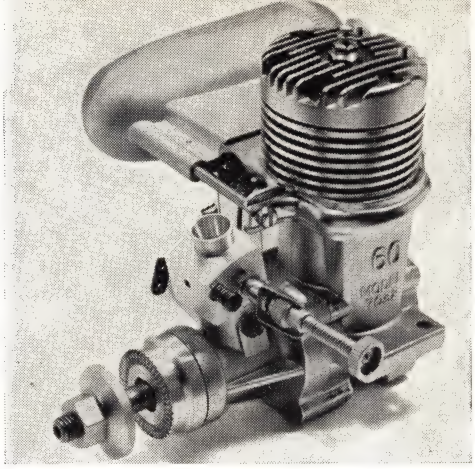
61. The Veco was one of six prototypes built by *Clarence Lee* and the others were working well for *Cliff Weirick*, *Doug Spreng* and *Phil Kraft*. Even though Brooke eventually won the World Championship with a *Merco 61*, this was not before he had wiped out two previous Mercos: one through piston-ring breakage and the other through demolishing the engine in a crash at the American Nationals.

To get back to the Enya. We formed the opinion that the engine's high compression and uncommonly late rotary-valve closure (55 deg. ATDC) were the cause of the engine's handling troubles. However, there was little doubt that these two features contributed much to the Enya's power output, which was definitely above average at the top end. *Saburo Enya* was unwilling to alter the engine's timing, which a good deal of experiment had shown to be the only way in which it could maintain its advantage over current R/C 60's. He did, however, make one small change, namely to increase the diameter of the orifice in the exhaust restrictor to 3.2 mm. Rather surprisingly, this seems to have helped a good deal. Our latest Enya, with this modification, still has a tendency, when being started, to occasionally kick its prop loose or to start and run backwards but we have not managed to provoke it into reversing direction or kicking its prop off while actually idling.

More recently, the Enya company have introduced a silencer for the *60-II* and *60-II TV*. This is a large capacity expansion chamber and can be used (on *60-II-TV*) in conjunction with the existing exhaust restrictor valve. We ran some tests on the engine with and without the silencer. Running on 5 per cent nitro fuel and using an Enya No. 5 plug, we achieved the following prop/r.p.m. figures *with* the silencer fitted:

7,650 rpm on 14 x 6 PAW (wood)
8,100 rpm on 14 x 6 Top-Flite (wood)
9,500 rpm on 13 x 5½ Top-Flite (wood)
10,300 rpm on 12 x 6 Power-Prop (wood)
10,600 rpm on 11 x 8 Power-Prop (wood)
10,900 rpm on 11 x 6 Power-Prop (wood)
11,800 rpm on 11 x 5 Top-Flite (wood)

The loss of power due to the silencer was negligible at the lowest speeds, rising to about 11 per cent at the peak. This is quite reasonable and, more important, since the Enya peaks a bit higher than most other current R/C 60's, it means that there is a worthwhile improvement in the speed that the silencer-equipped Enya will turn popular size props compared with these other engines. For example, on a 12 x 6 Power-Prop it was 300 r.p.m. faster than the latest *S.T. 60 R/C* when the latter was fitted with a *Pike* or *Koelliker* silencer and 500-600 r.p.m. faster on an 11 x 5 Top-Flite. On this latter size, both engines are, of course, running beyond their peaking speeds, but this does illustrate the Enya's edge in power. On props more closely matched to the engine's peak power, in actual flight, the Enya should still have a 400-500 r.p.m. advantage.

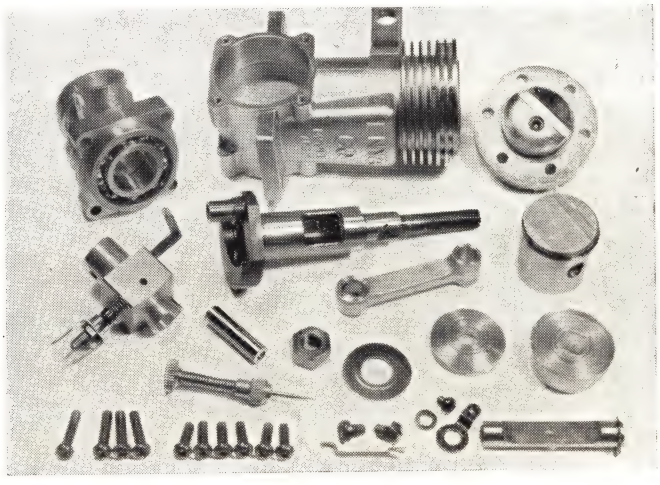


The throttle system on the *60-II TV*, unlike the large and complicated carburettor of the *35-II TV* and *45 TV* models, consists of a conventional single jet barrel-throttle carburettor with airbleed idling adjustment coupled to a semi-rotary restrictor in the exhaust duct. As on the O.S. engines, the needle-valve assembly, complete with fuel inlet tee, is mounted on the left-hand side and can be adjusted to vary the choke area. We found the throttle easy to adjust and the reliable idling range seems to be in the region of 2,500-2,700 r.p.m. Minimum continuous bench idling speed obtained was 2,200 r.p.m.

Although the Enya appeared to run quite hot, there was no tendency, even after less than one hour of running in, for it to lose power as it warmed up. On the contrary, when lightly loaded for speeds above 13,000 r.p.m., it picked up some 700 r.p.m. as running temperature was reached.

As we have said, the *60-II TV* features bronze bushes in the piston bosses. Both ends of the forged aluminium con-rod are also bronze bushed. The piston is machined from aluminium bar and has a flat crown with straight baffle. The cylinder liner is tightly fitted to the casting and has relatively small port areas, giving exhaust and transfer periods of, respectively, 124 degrees and 104 degrees. The cylinder-head is a hemispherical pattern and no head gasket is fitted. The crankshaft is carried in one 15 x 32 mm. and one 9.5 x 22 mm. ball bearings. The engine weighs 13.8 oz or 17.2 oz complete with silencer.

Above: the Enya 60-II TV, a robust and well-made engine of above-average performance when fitted with the Enya silencer shown. The engine has a capacity of 9.95 cc. or .607 cu. in. derived from a bore and stroke of 24 x 22 mm.



Right: parts of the Enya 60-II TV. Both ends of the connecting-rod, plus the piston bosses, are bronze bushed for extra durability. Note the large (15 mm.) diameter crankshaft.

PILOTS' PATTER

BY PETER WATERS

R/C PILOTS OF THE FUTURE? David Charles (left) and Stephen Grimmett (right) are the keenest fetchermites yet seen at the local field. Will willingly walk half a mile to recover and switch off any R/C model—but only R/C models!

FIRST an apology to all those experienced single channel pilots whom I seem to have annoyed in the last part of my patterings as can be judged from the letter (on page 341). I have been a multi man for a number of years but I do occasionally return to single channel, and I mean single button method of controlling. However, these brief excursions are simply for relaxation from the screwed up nervous tension I get into when flying proportional. I do manage to tour the country at the weekends quite regularly and although this is to attend multi competitions, I have noticed already this season that competitors in single channel contests really do have considerable difficulty in flying suitable patterns set out for them. Maybe your club does have a good bunch of single channel pilots—but until I see them in a competition how can I hope to judge their ability? So why not give those comps a try! It is all very well to say that Joe Bloggs is a good pilot but can he fly precision courses? Can he actually drive his aeroplane where he wants it to go? If you think of this carefully for a few moments you will realise that many people can fly a model around but if these same pilots would fly a set course then they would begin to encounter difficulties. The mere ability to get a model up and down with full control and no bent bits at the end of the flight seems to satisfy the majority of modellers, so I still maintain that the general standard of single channel flying is extremely low, but I am prepared to withdraw this statement if you can supply proof to the contrary. By the way, our critic states, "Mr. Waters has not travelled much then?" Now I live in South Wales, so just have a good look at a map and see how far it is to Hemswell, Derby, Cranfield, Tern Hill, Odiham, Golden Cross, Upwood, etc., all the regular competition venues. Not one of these places is within 180 miles and we do these return journeys in one day. Last season I covered over 20,000 miles—and already this year have clocked over 1,000 to competitions alone.

Rolls Royce Rally Reflections

The annual "Derby do" was most enjoyable and what a crowd of people there were there. This opening contest of the season is a great opportunity for the regulars and the newcomers alike. Nice new models were everywhere. Some were not so new and seemed to be earmarked as expendable for the Limbo event!

The Goodyear models at this event were the first I had seen in this country. They looked superb and surprised me with their speed and stability. I had read hair raising reports and received tape recorded messages from America suggesting that Goodyear Racers were generally vicious and spun in very easily. So I was delighted to see examples behaving with surprising docility. It was also surprising to notice that reed and proportional equipped models performed equally well, so here perhaps is where the *giggle boxes* do not seem to hold an advantage. At this time, my Goodyear model was still being doped ready for the Bristol M.A.C. Hullavington meeting the following weekend so I managed to learn a few things that seemed to be useful. Firstly—make control surface movements small, $\frac{1}{4}$ in. on elevator and ailerons seems to be sufficient—hold a little right rudder for take-off and be sure to use the correct centre of gravity position.

The open pylon event was a sweep up for Frank Van den Bergh again. The radio control subcommittee has decided to change pylon rules to fall in line with the American system. These changes are necessary because at the Derby rally, each pilot stood in the centre between the two pylons and this meant he had to turn around and find the next pylon each time the model passed him—a little hairy sometimes! U.S.A. practice is to stand the pilot near the down-wind pylon so that he flies his model up-wind, turns and then flies back to his pylon for the next turn. This system requires less officials since the time keeper and lap counters also act as judges on the bottom pylon. Thus, the course will now be easier to fly and should result in faster times.

The Limbo session was certainly different from anything else I have competed in! There were surprisingly few crashes and the crowd seemed to love it. The technique I found best was to stand between the poles so that it was possible to guide the model quite accurately through and under the string. Inverted passes scored double points, but I feel that a change in this method of scoring is needed. How about one point for upright passes and three for inverted passes, also two passes allowed per round and each one to score? Or simply the direct eliminator but requiring two upright passes out of three attempts per round.

Bristol M.A.C. Goodyear Event

Next weekend held a problem—whether to go to Tern Hill or Hullavington or both. Well a few snags came up during the week. People dropped in for a natter and noggin during a spraying session,—so it meant passing up Tern Hill and test flying of my Goodyear racer on Sunday. Naturally it rained, but cleared by 4 p.m. and we managed five flights to

check it all out. The *O.S. 40* was new but seemed satisfactory and I decided to stick to a light nylon prop. to avoid over-revving the motor and it still had 5 per cent nitro in a standard fuel mix in any case! ! !

I therefore turned up at Hullavington with a five flight old model, never having seen or flown a Goodyear course before, and the prospect of four at a time frightened me no end! I even thought of going back to the cheaper reed outfit! However, it turned out to be quite safe.

My recollections of the actual races are very hazy because when actually flying I rarely saw other models and in between the heats I was so busy nattering I only watched a few laps.

Goodyear Technicalities

What then do I think of the Goodyear events? Firstly, it's great fun to fly—honestly. Racing is against the clock but when the models bunch up then you realise that competitors actually race against each other. Secondly, it is a team event, since a helper can be invaluable in directing the pilot to achieve a correct course through the pylons. My helper was actually calling the turn at the upwind pylon as soon as he saw the flag marshall start to raise his flag—enabling me to turn my model around the pylon as tightly as I possibly could. Let me take you through a typical race.

R.O.G. Don't climb too steeply,—a shallow climb on take-off gets you to the upwind pylon quicker.

On the upwind leg, my helper directs the heading, called left or right corrections, aiming the model about 20 feet to the right of the pylon at about 30 feet altitude. As soon as the flag man signals my arrival (or sooner!) the helper calls the turn, which requires left aileron to roll the model to the vertical and then full up elevator to hold a pylon turn. A little right aileron then produces a smooth recovery. Avoid a zoom recovery by putting in some down elevator if necessary. On the down wind leg, my helper again tells me where to fly to place the model about 10 ft. outside the pylon, and by now I would have been guided back to stand close to the pylon base line and about half way between the two pylons. When the model is about 50 ft. from the base pylon, I roll it onto its side ready for a tight, downwind pylon turn. The model is heading down wind and will not drop very quickly, so as soon as it reaches the pylon I pull up elevator to hold the model tight around the pylons. The cross wind leg is where the time is made up. Keep the turns tight and level and really close to the pylon. It is not necessary to roll the model out after the first turn into the cross wind leg of the course, as it will usually roll back slightly towards the upright position and then up elevator will maintain the desired attitude until tightened up around the third pylon back into the upwind leg. Repeat this nine more times and you have made it! I think it is necessary to forget the possibility of a collision and fly your own course to achieve a fast time. There were no collisions at Hullavington, but this is bound to happen eventually.

Dear Sir,

We read Mr. Waters' item "Pilots Patter" R.C.M. & E. May 1966. He stated—"the standard of single channel flying in this country is very, very low . . ." ?

Mr. Waters has not travelled much then!? If he cares to come to Cheshire and Lancashire principally to Richmond SV Playing fields Ashton-U-Lyne, and "Rising Moon"—Near Stalybridge, he will see a standard of R/C single channel flying to make you multi-men blush and gape.

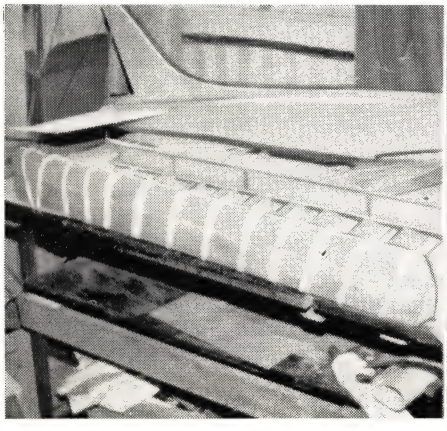
Naughty—naughty—Mr. Waters. Get your facts right —FIRST—look about you—.

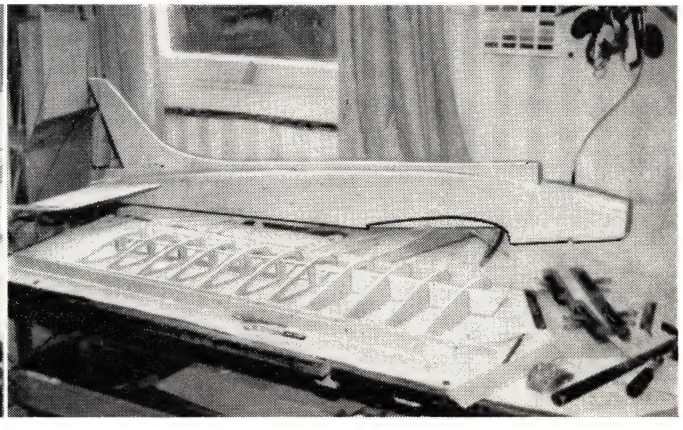
Stalybridge, Cheshire.
J. S. Broadherst and friends.

What have I learnt since? The motor is now in full song with a 10 x 6 wooden propeller, 5 per cent nitro fuel and a KLG type plug. The speed has been calculated repeatedly at 80 miles per hour plus in level flight and over the ton with a dive into the pylons! The flat bottom section wing is best from the novice angle, but a disadvantage is that with a build-up of speed, more down elevator is needed to kill the resultant climb, so a symmetrical wing seems to be necessary for a fast time. The weight of the model does not appear to matter, but my new model will be built down to around 4½ lb. and will have a more potent *K & B Series 66* motor. I also feel that eventually the rules will have to be examined more carefully. For example, the sizes of wheel pants and cheek cowlings can be reduced considerably and so enhance speed capabilities but at the expense of scale appearance. I do not think that all-out speed is going to be all that important. Pilot ability will probably be the decisive factor and this is what we really want. We may, however, be getting back to square one again with the regular experts winning.

Personally, I feel that this type of model should not necessarily be true scale. Instead, the model should be semi-scale to a set of specifications that enable one to design one's own model and not loose points for lack of true scale appearance. We will have to watch the rule jumpers so let us not get too wrapped up in pretty models that look as impossible as control line team race models are now.

Our author's latest creation! Bare airframe weight before covering was 31½ ozs. Total weight with Merco 61 motor and Min-X Astromite VI radio is 6 lbs. 3 ozs. Construction techniques and light airframe weight suggest control line practice creeping in.





R.C.M. & E. TEST REPORT

O. S. MINITRON

12 CHANNEL REED CONTROL SYSTEM

A TECHNICAL OPINION BY W. PETER HOLLAND

The complete O.S. Minitron 12 channel system as supplied direct from Japan, arrived in complete working order. System is provided with transmitter battery box, receiver connectors, switch and jack plug, plus frequency pennant.

ONE'S first comment on commencing a test on this equipment is that the wiring diagram shown in the instruction booklet requires rather more than the usual amount of unravelling. It would have been much more clearly put in a rectangular layout. The fact that the instruction booklet is in basic Japanese could add to ones confusion. This diagram shows a separate battery pack for the servo supply and indicates that a separate switch and battery harness complete with plug and socket would be necessary. A tag board is also shown for connecting the main power wires, bias etc. The only pertinent section of the diagram which your tester was able to use was the receiver battery connection illustration, although here again it was simply a matter of chasing the appropriate wires, a thing normally done in strong disbelief of the printed word and accompanying illustration.

The first piece of information which requires clarification is the fact that there are two pink wires, a darker pink being the reed comb connections. This is led to one of the servo plug connections, there being two such sections of the harness, a third four pin (three used) plug and socket provides the power connections to the receiver via a double pole on/off switch. An earphone socket is wired in via the white and positive leads. This socket and one switch are provided, one has however to find a battery box and other parts of the system in addition to the servos. A separately packaged, 8 pen cell power pack was provided for the transmitter.

Transmitter

The finish on the equipment is excellent and the control keys have a nice soft "feel" to them, it was found that the amount of pre-travel and the amount of over-travel, after tone is transmitted combined to produce just the right effect. Pre-travel varies between $\frac{1}{8}$ and $\frac{3}{16}$ inch measured at the top of the control lever. The over-travel amounts to $\frac{3}{16}$ inch or a little more to enable one to give smooth thumb pulses without any "hard edges". The amount of effort required to make contact was 5 ounces and the amount of effort to achieve total movement of the key was 7.75 ounces.

Construction

The construction is quite clean and straightforward and all components are mounted on a $\frac{1}{16}$ inch glass epoxy printed circuit board with the components facing the back of the case in the majority of cases and a pair of toroidally wound chokes share the opposite side of the panel with the key switches, the latter providing a fixing point for the whole unit to the front of the case. A small steadying bracket is mounted at the bottom. The battery pack is wrapped in sponge rubber and is wedged in behind the circuit board. The tone adjustment pots are positioned in two banks of six and are numbered, although their position does not correspond to the key switches and reference has to be made to diagrams in the leaflet. There are five keying switches to provide the normal 10 channels, the additional two channels marked 'A' and 'B' are push-to-make, click action switches, a similar unit mounted at the top left hand corner of the case is used to check battery state. The meter normally reads output.

Performance

Current.
13.5v. input from 8 pen cells in series . . .
Carrier: 48 mA
Tone: 94 mA—96mA depending on whether one or two

tones are transmitted, the current varies slightly according to the tone frequency keyed.

Modulation.

The oscilloscope display indicated modulation amplitude of approximately 150% carrier level amplitude. Display showed a chopped sine waveform cleanly produced.

Output.

As far as could be ascertained on the field-strength meter the highest level of output was on modulation and amounted to approximately 75 milliwatts.

Endurance.

The transmitter was operated continuously for 35 hours before operation became inconsistent.

Stability.

Temperature stability was excellent, the outfit being heated to 120°F. and cooled to 32°F. with no change in function. This was just a simple go, no-go check.

Voltage stability was measured by reducing the input and it was possible to reduce volts down to 3v. before the reeds failed to respond at fairly close range, receiver was mounted behind screen and aerial rolled and placed in a screening can.

Physical Data

Size of Case		Projection of keys 1 in.
Height	$6\frac{3}{4}$ ins.	Projection of handle $1\frac{1}{4}$ ins.
Depth	$2\frac{7}{8}$ ins.	Projection of aerial when retracted $7\frac{1}{4}$ ins.
Width	$5\frac{3}{8}$ ins.	Projection of aerial when extended 50 ins.

Weight 3 lbs (with batteries)

Receiver

The receiver is a quite compact flat little package in a stout aluminium case. Three I.F. cans are used and a rather larger than normal reedbank to accommodate the 12 tones was fitted. The components are all mounted on a $\frac{1}{16}$ in. glass epoxy board held down by four screws fitting aluminium eyeletted-in fixing nuts in the p.c. board.

The case is in two pieces and is not fitted with any bolts or any other means of securing the two halves, these halves fit quite tightly and it was found in later tests that the receiver was not affected by "mechanical noise". We normally recommend that cases be bonded together to avoid this occurrence.

Performance

Currents.

6v. input from four pen cells (manufacturer recommends a separate battery pack for the receiver supply, although we found that servos operated successfully on a common DEAC power supply).

No signal 7.5 mA
Carrier 7 mA
1 tone (high) 32 mA
(Low) 45 mA
2 tones (Mid range) 38 mA

Sensitivity.

Better than one microvolt.

Interference.

A worn and unsuppressed *Kako* motor was brought to within 3 inches of the aerial before interference reached a level where servos were triggered intermittently due to reed movement, a meter showed that the level of interference was at this stage quite high. Generally speaking, the receiver is not particularly affected by interference and normal servos operated successfully with the device.

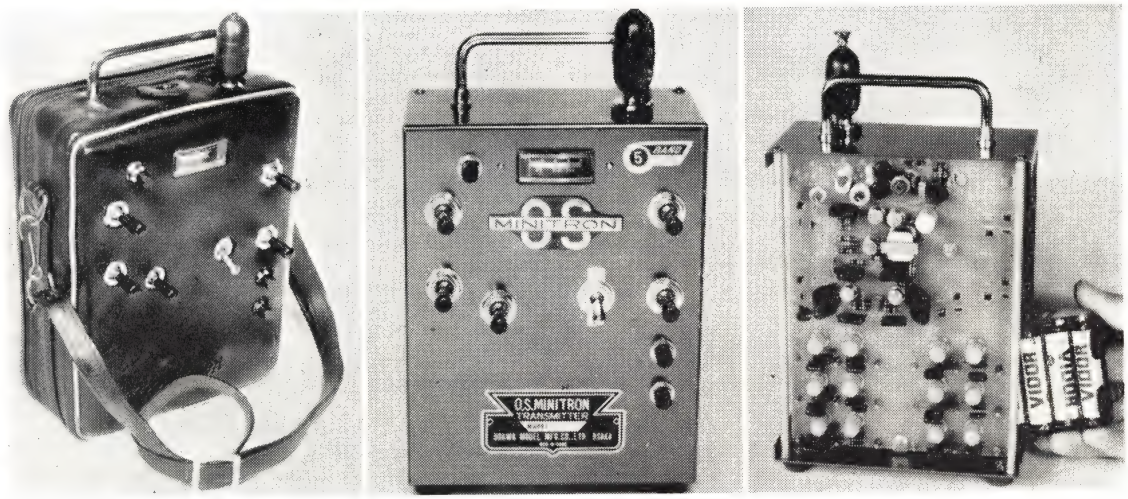
The reedbank seems well constructed, uses un-plated steel reeds and responds to A.F. frequencies from 340 to 580 c.p.s. It was noticed that reeds numbers 5 and 6 were almost the same length, and in fact careful examination of the reedbank showed that some pairs of reeds were more closely spaced in terms of audio response than the others. In one particular case quoted, it was necessary to adjust the tone from between 419 to 426 cycles per second to prevent the adjacent reed responding.

The tone adjustment pots on the transmitter have an average range of 30 c.p.s. so that adjustment is relatively easily facilitated. At close range however, it was noticed that both these reeds did strike even though the contacts were adjusted for the optimum performance.

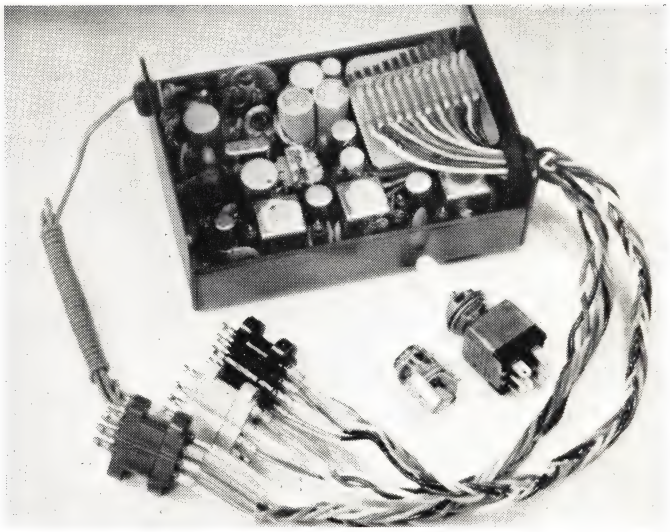
Interference from other sources

The receiver was affected by close range operation of a superregen monitor though this might be expected with other superhet outfits. Similarly it was found that the same monitor was affected by the receiver when at close range.

Extreme left: the transmitter is supplied with imitation leather case cover and strap. Cover prevents those unsightly scratches from ruining the case appearance, and also prevents fingers from becoming really frozen on wintry days. Centre: transmitter with cover removed, showing control layout. Note battery test button adjacent to meter. Below: transmitter component board. Note neat control pots.



The 12 channel superhet receiver, showing tightly packed components on single p.c. board. Connectors, jack plug and switch are provided with unit.



Manufacturer
Ogawa Model Mfg. Co. Ltd., Hiranobaba, Higashisumiyoshi, Osaka, Japan.

British Importer
E. Keil & Co. Ltd., Russell Gardens, Wick Lane, Wickford, Essex.

Price £75 11 0

Stability

Temperature.

The receiver was heated and cooled as described in the Tx. section of this test where it will be seen that the system functioned correctly.

Voltage Stability.

Rx. voltage was reduced to 4v before operation became intermittent. Sensitivity was reduced to 8μv.

Physical Data

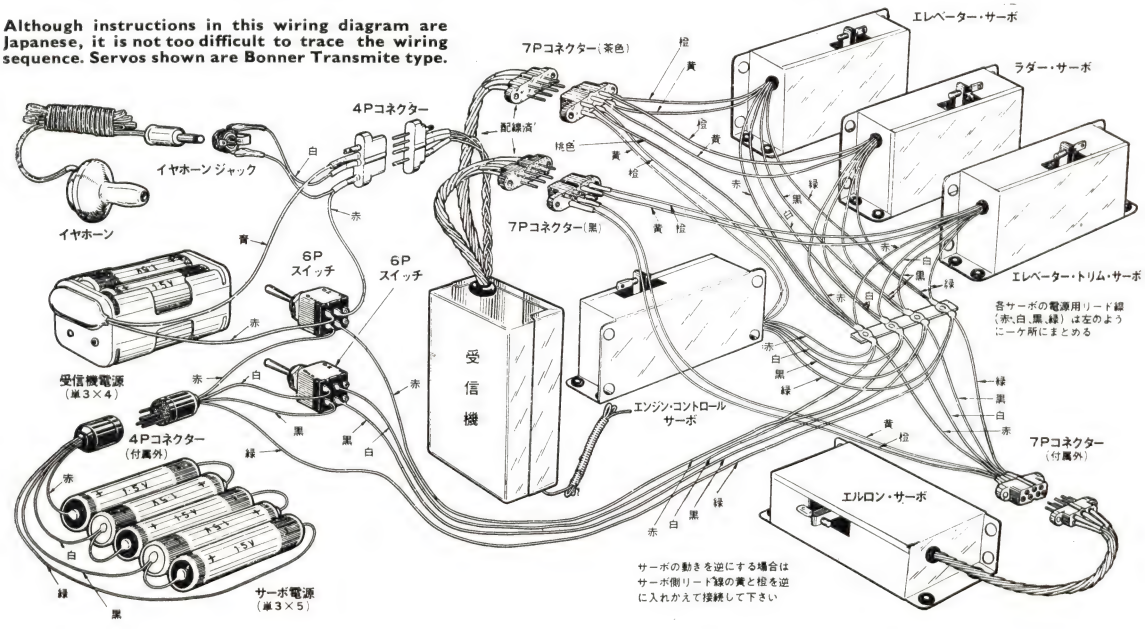
Length: 3 ins.
Width. $2\frac{3}{16}$ ins.
Depth: $1\frac{1}{16}$ ins.
Weight: $4\frac{3}{4}$ ozs.

Generally

The complete Tx./Rx. outfit represents a good standard of construction, handles nicely and performs, on the bench at least, extremely well. Flight tests were precluded in view of shortness of time available for the production of this test. Range is 900 yards. The harnessing system is quite workable and the plugs and sockets used are of a good fit and showed no signs of intermittent contact even when subjected to prolonged vibration on the test analyser. We would normally have recommended a turn of Sellotape round these plugs and sockets, but they held well after several hours of vibration.

The modeller has to solder up some sections of the harness, but as this largely depends on the source of servos the advantages of a complete harness system might have a restricted one to a choice of one or two different makes of servos instead of a more widely selected range. This, perhaps is why the manufacturer indicates that a separate battery pack be used for the servos. We found no interference problems by using a common battery pack.

Although instructions in this wiring diagram are Japanese, it is not too difficult to trace the wiring sequence. Servos shown are Bonner Transmite type.



COMMERCIAL DEVELOPMENTS

A MONTHLY SAMPLE OF NEW PRODUCTS AT HOME AND ABROAD

RADIO control equipment of any type from France is rare, in fact no French R/C equipment has ever been mentioned before in Commercial Developments, although indigenous French equipment is available—for instance, *Radio Pilote* is a little-known brand of R/C covering multi reed and digital proportional systems.

We were therefore most interested when Managing Editor Ron Moulton returned from Paris (F.A.I. conference so he says—but keeps on talking about a place called "The Crazy Horse") with an *AirAlma* kit for an R/C **Tipsy Junior.** This aircraft has always been one of the Editor's favourites and the kit was quickly requisitioned.

AirAlma's Tipsy Junior spans 52 in. but even so has a wing area of 650 sq. in. This puts it well and truly into the full house multi class and we feel that the kit manufacturer is perhaps being a little coy in recommending it for 6 channel radio and a 5 cc. (.29 cu. in.) motor. Ours will definitely carry full house radio and will be powered with either an *O.S.50* or *Merco 61,* depending on how the weight turns out.

The kit is commendably good. The wood in the sample received was a little hard and heavy, but not overly so and nothing to really complain about. There is absolutely no die cutting at all in this kit. Instead, 90 per cent of all components are ready shaped for use and so far, construction proves that they fit. The kit features main undercarriage legs shaped from 10 s.w.g. wire and the hardware package includes aileron bell-cranks and control horns moulded in nylon.

Plans provided are clear and building notes are written in English as well as French. Although we have not yet gone into scale authenticity very deeply, there are obviously a few concessions to exact scale shape—in particular, the wing tips, which have a simplified section. However the really fastidious scale modeller can easily correct this, and for anyone—scale fan or plain sport R/Cer who just likes a model that flies, the AirAlma Tipsy Junior will be something of interest.

The kit is available in Great Britain from *Henry J. Nicholls Ltd.,* and costs £15 3s. 6d.

Servo for Galloping Ghost

For a long time now, it has been the contention of the editor that the lack of interest in Galloping Ghost control systems has been due to a similar lack of commercial equipment readily available. However, manufacturers, particularly in U.S.A. seem now to be rediscovering this form of control, which has, up until now, been very much a tinkerer's art, the demands of which must certainly have deterred some of the potential G.G. operators. In Britain too, Galloping Ghost systems are now available from *Aercon Developments* and *Derek A. Olley,* both having been mentioned in Commercial Developments columns.

One of the greatest shortcomings in the Galloping Ghost system is the servo, and the control surface linkage, which traditionally required a "wire bender's delight" cage at the rear to transmit torque rod movements to rudder and elevator controls. Incorrect angles here can easily upset the entire control system, and we are therefore very pleased to see a new Galloping Ghost servo now available from *Take Off Products* in U.S.A. This servo, the **Rand LR3** is really a first-class unit and has already received very favourable comments in the American model press. The Rand LR3 has a precision Japanese *Mitsumi* motor and is devised to entirely eliminate the wire cage at the rear end on the model, providing instead, conventional "multi" pushrod linkage drive outputs. Besides delivering outputs for proportional elevator and rudder commands, the servo also provides positionable throttle control with full on and full off signal commands. The full off signal commands low speed throttle position and also provides a measure of "failsafe" mode, since if the receiver loses the transmitter signal, the servo will throttle back the motor and continue to rotate through rudder and elevator cycles, providing virtual neutral rudder and elevator positions.

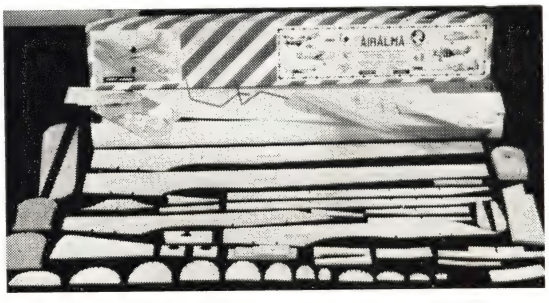
The Rand LR3 measures 2 x 1⅝ x 1 in. and weighs 1¼ oz. Switched from a relay it operates from a 4.8 v. centre tapped power supply. Signal requirements are a pulse rate variation of 4-12 p.p.s. with a 6 p.p.s. neutral signal. Pulse width variation is 70 per cent—30 per cent, 30 per cent—70 per cent.

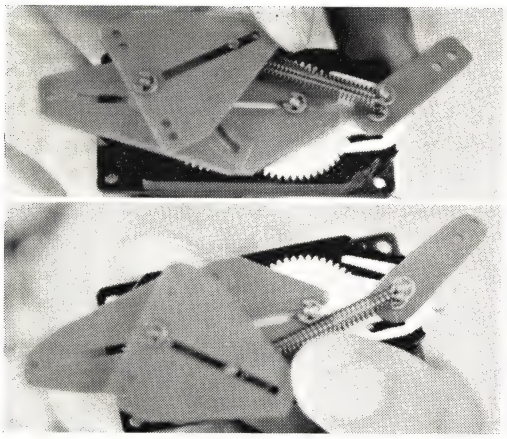
U.S.A. price is $19.95, but the Rand LR3 will shortly be available in this country through Ripmax Models & Accessories.

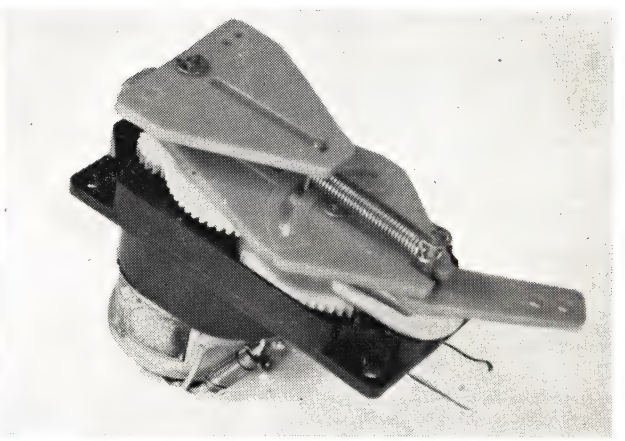
Wheel Pants for Goodyear

Currently available from *Modelradio Co.* are *Williams Bros.* Moulded **wheel pants.** These are supplied in unjoined moulded half-shells, which can be joined with

Spread of components from the AirAlma Tipsy Junior kit. Most components are shaped ready for use as can be seen here. Undercarriage legs are ready formed, and the plan details are written in English as well as French.







The Rand LR3 Galloping Ghost servo, showing extremes of rudder and elevator throw. Separate lever for throttle control can be seen bottom right hand corner of right hand picture.

polystyrene cement, using the moulded-in keying pins to ensure correct alignment. Axle attachment points are reinforced, and these slimline spats measure $9\frac{1}{4}$ in. overall. Weight per pair is 3 ozs. and they cost £1.11.0d. from Modelradio Co.

From the same source come **etched circuits baseboards** for the **Digitrio,** three function digital proportional control system, which was featured in the American publication *Radio Control Modeler.* Sets of three boards are available in drilled or undrilled states as required. Price undrilled per set is £1.10.0d., and drilled £1.17.6d. After looking at the number of holes we must say that it is worth the extra 7/6d. to have these drilled.

Merco 61 Mk II

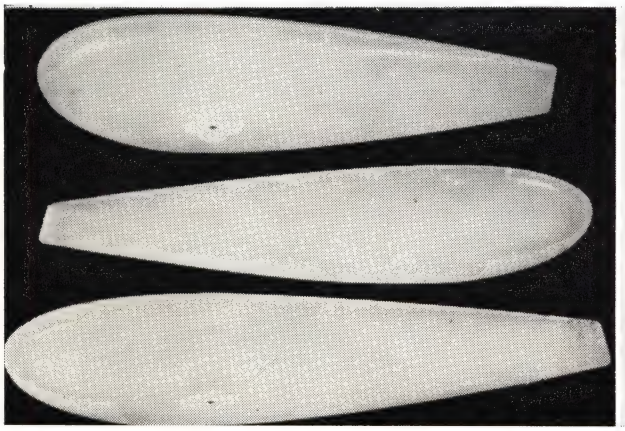
After many gallons had flowed through the prototype, Mk II versions of the Merco 61 and 49 became available last month. Externally one sees only the extra plug which aids ignition at low speeds, improves r.p.m slightly and eliminates the need for a shielded plug. Internally, the mods go further. World record flights in the U.S.A. by Dr. Walter Good and Maynard Hill plus experiment by Joe Socle and Dennis Allen himself led to the new bushed piston bearings, thinner gudgeon pin and bushed conrod. All these four new bushes are honed for super fit. The result? Better slow running and an insensitivity to fuel level, to further enhance a great reputation.

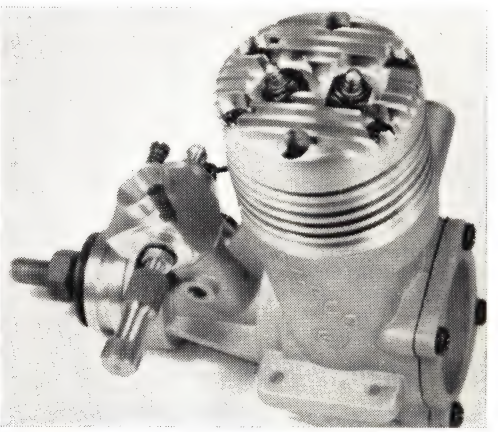
Below: Williams Bros. moulded wheel pants as imported by Modelradio Co. Axle attachment points are reinforced. Right: Merco 61 MkII, showing twin plug head. Battery clip need only be attached to one plug for starting.

New MacGregor Transmitter

During a recent visit to *MacGregor Industries* we were able to obtain a pre-production sample of their latest **all transistor transmitter.** The new unit is very much smaller than MacGregor's current all-transistor transmitter, and has a five transistor, crystal controlled circuit, working on 18 volts. Case size is only 6 x $3\frac{1}{2}$ x $1\frac{3}{4}$ in. and the unit sports a very nice micro-action keying button. The manufacturer claims a high output power for this little transmitter, and with 18 volts power supply, this is probably not surprising. We shall be saying more about this later.

The name MacGregor has, for some years now been associated entirely with single channel equipment, but MacGregor industries are currently working on some ultra-reliable tuned filter multi channel systems. We have examined prototypes and await with interest the production unit.





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PRESS DATE for August issue, 1966, July 8, 1966.
Private Minimum 18 words 6/- and 4d. per extra word.
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FOR SALE

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SKEETER

Continued from page 337

Landing with this model, as with any other, is the most difficult part of the flight, and necessitates careful familiarisation with landing characteristics. Introduce landing trim at a safe altitude, and refrain from applying elevator corrections on the approach. Do not try to flair out as the stalling speed is very high and a stall on the landing approach is sudden death.

The model, incidentally, is reasonably aerobatic with a surprisingly tight looping radius, and will execute consecutive upward rolls.

Designer Eric Herbert and prototype Skeeter seen at recent Rolls Royce M.A.C. rally. Model used CitizenShip proportional radio, and O.S.40 motor.

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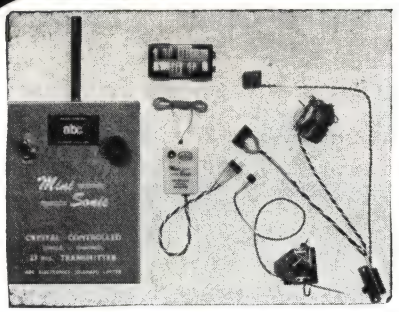

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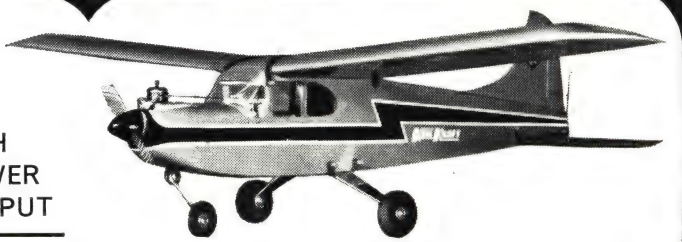

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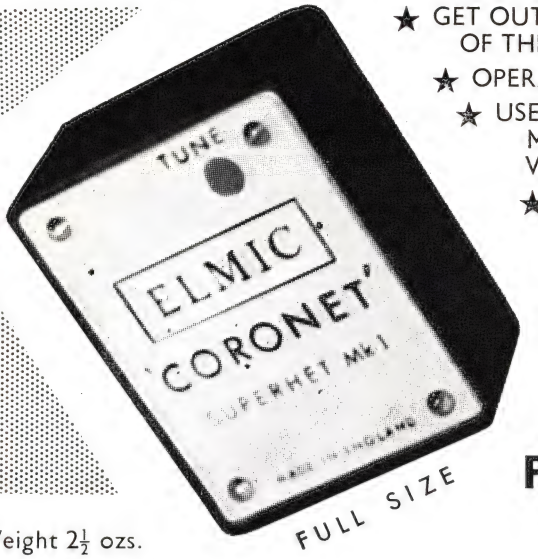

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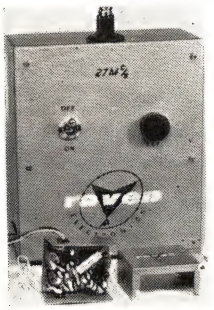

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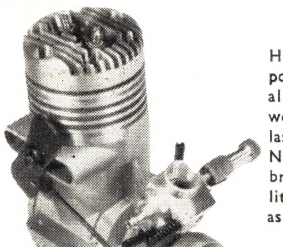

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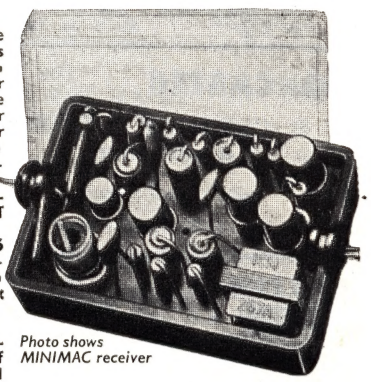

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Transmitter

Size 6″x5½″x2¼″

Tone Frequency
High (C) 11 Kc/s
Medium (B) 5.5K c/s
Low (A) 3.8K c/s

Weight 1lb. 2 oz.

Currents
40 ma. carrier
48 ma. TONE

Receiver

Size 1¼″×1 3/16″x⅞″

Weight 1½ oz.

Output 550ma. at 60°C.

Case 22 swg. Aluminium Alloy.

Price:
Transmitter and filter receiver RV.1, 2 & 3 £18. 19. 6d.

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Two receivers are available in the multi-channel range, the super-regenerative receiver and the super-het receiver. Both are constructed on glass-epoxy printed circuit board and both carry ten channel reed-banks no matter how many channels are used.

The receivers are amongst the smallest available and yet offer a neatness unsurpassed by any other manufacturer; no form of component crowding has been indulged in.

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Volts .. .. .. 12 volts
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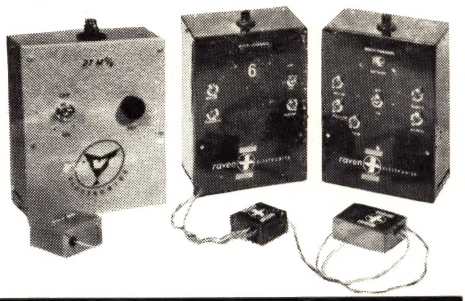

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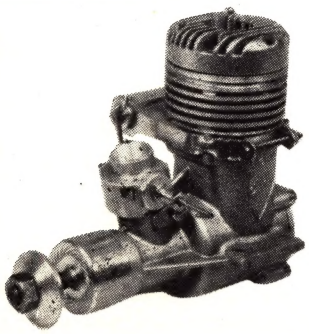

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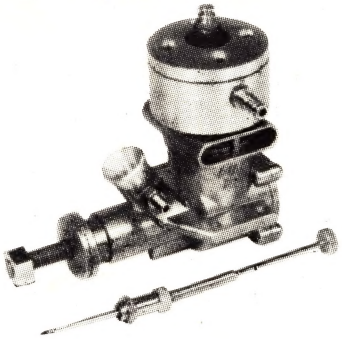

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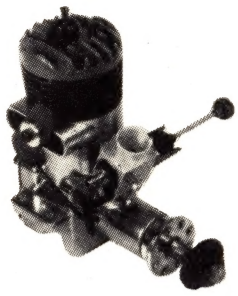

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